

# Route 1A/Lynnway/Carroll Parkway Study in Lynn



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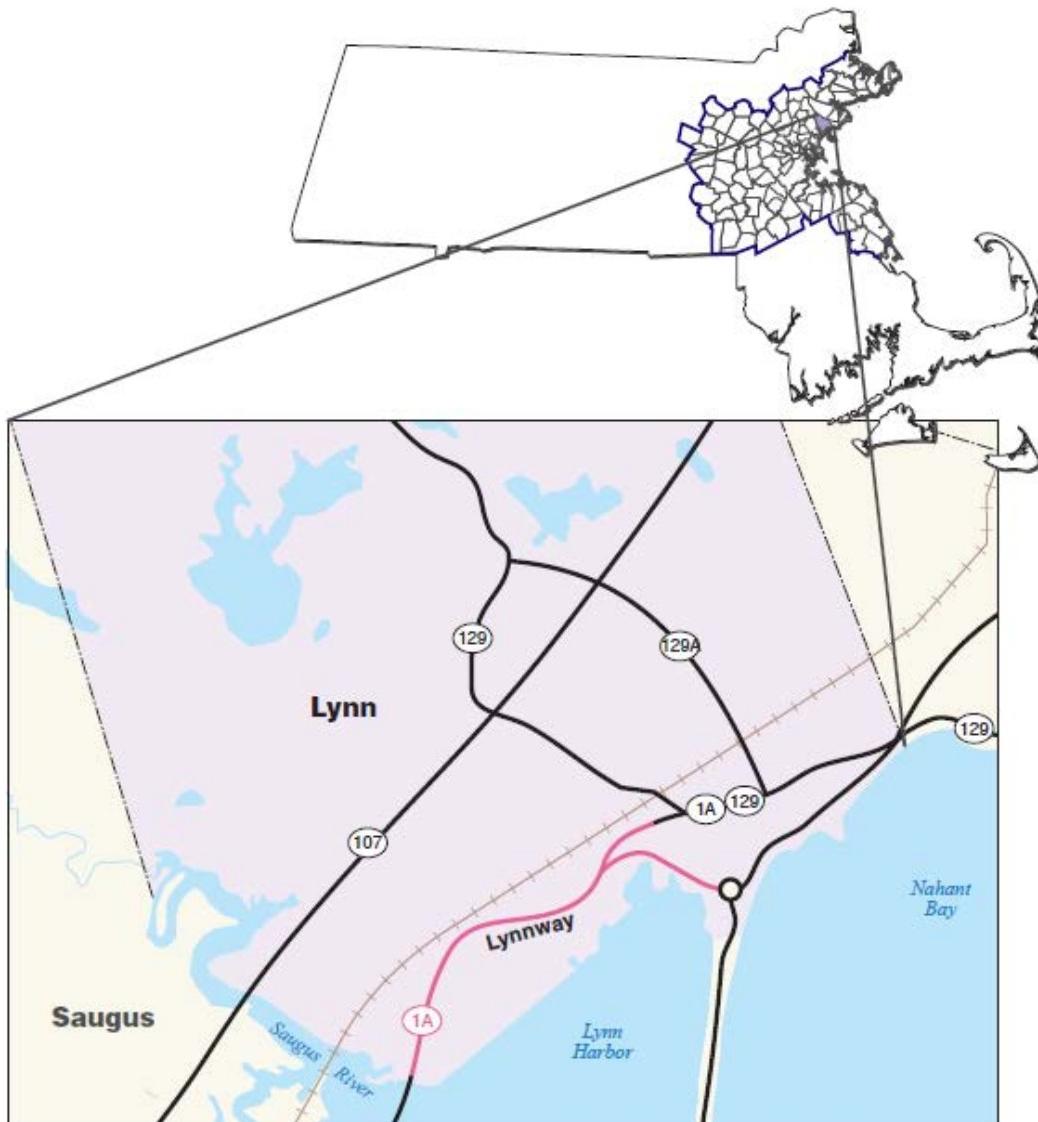
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## ABSTRACT

Following a selection process based on safety conditions, congested conditions, multimodal significance, regional significance, regional equity, and implementation potential, the Route 1A/Lynnway/Carroll Parkway arterial segment in Lynn was approved for study by the Boston Region Metropolitan Planning Organization (MPO). The roadway runs through an area that has been classified as a Commonwealth of Massachusetts Growth District, an important designation for older urban cities in need of increased tax bases and commercial and residential development. The City of Lynn has made major progress toward redevelopment by completing the physical and legal changes necessary to redevelop 305 acres of underutilized waterfront land. However, the current configuration and size of the Lynnway inhibits access to the waterfront—six-to-seven lanes of traffic act as a barrier, cutting off the waterfront from Lynn's downtown and neighborhoods.

MPO staff, working with the study advisory task force, has developed short- and long-term alternatives that would transform the Lynnway and Carroll Parkway into a pedestrian- and bicyclist-friendly roadway as well as a transportation corridor that serves all modes of transportation and maintains regional travel capacity. This study provides the City of Lynn, the Department of Conservation and Recreation (DCR), the Massachusetts Department of Transportation (MassDOT), and other stakeholders with an opportunity to begin researching the needs of the Lynnway and Carroll Parkway—in light of the city's vision for the Waterfront—and to start planning design and engineering efforts.

This report summarizes the analyses and improvement alternatives resulting from the study. The opening sections provide background information for the study by describing the existing conditions and problems. An assessment of the safety and operational problems, and a discussion of the potential improvement alternatives, follows the background sections. The report also includes technical appendices, which cite the methods used and data applied in the study, including detailed reports about the intersection and arterial capacity analyses. If implemented, the report's recommendations would result in an improved roadway corridor: one where it is safe to walk or bicycle to shops, recreational areas, and work; that provides safer access to businesses; and where traffic operates efficiently.

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# Chapter 1—Introduction

## 1.1 ORIGIN OF STUDY

The Boston Region MPO's Long-Range Transportation Plan (LRTP), *Charting Progress to 2040*, identified needs for all modes of transportation in the MPO region.<sup>1</sup> This plan guides decision making about which projects to include in current and future Transportation Improvement Plans (TIPs).<sup>2</sup> Projects address the region's current mobility needs, focusing on maintaining and modernizing roadways with high levels of congestion and safety problems; expanding the quantity and quality of walking and bicycling; and making transit service more efficient and modern. Based on previous and ongoing transportation planning work, including the Boston Region MPO's Congestion Management Process (CMP), the Massachusetts Bay Transportation Authority's (MBTA) Program for Mass Transportation (PMT), and other MPO planning studies, the LRTP identified 52 arterial segments in 38 communities where highways need improvements.

To identify strategies and solutions for addressing the problems in some of these arterial segments, an arterial segment study was included in the federal fiscal year (FFY) 2015 Unified Planning Work Program (UPWP). An arterial segment study is a logical way to identify and address multimodal transportation needs in a corridor. Typically, these studies use a holistic approach that analyzes services and then makes associated recommendations within the roadway's right-of-way, and takes into account the needs of all abutters and users—pedestrians, bicyclists, motorists, and public-transportation riders.

During the past five years, the MPO has conducted five arterial segment studies, and municipalities have been receptive to them. The studies provide cities and towns with the opportunity to review the requirements of a specific arterial segment, starting at the conceptual level, before committing design and engineering funds to a project. If the project qualifies for federal funds, the study's documentation also may be useful to the DCR, MassDOT, and the City of Lynn.

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<sup>1</sup> *Charting Progress to 2040*, the Long-Range Transportation Plan of the Boston Region Metropolitan Planning Organization, approved by the Boston Region Metropolitan Planning Organization on July 30, 2015.

<sup>2</sup> Transportation Improvement Program and Air Quality Conformity Determination, Federal Fiscal Years 2016–20, endorsed by the Boston Region Metropolitan Planning Organization on July 30, 2015.

# Chapter 2—Background and Objectives

## 2.1 SELECTION PROCESS

Following a selection process based on safety conditions<sup>3</sup>, congested conditions<sup>4</sup>, multimodal significance<sup>5</sup>, regional significance<sup>6</sup>, regional equity<sup>7</sup>, and implementation potential<sup>8</sup>, the Route 1A/Lynnway/Carroll Parkway arterial segment in Lynn was approved on April 2, 2015, for study by the Boston Region MPO from a short list of 52 arterial segments. DCR, MassDOT Highway Division District 4, Metropolitan Area Planning Council (MAPC), and the City of Lynn supported the study, and participated by collecting the data needed for the analyses.

### 2.1.1 STUDY LOCATION

Figure 1 shows a regional map with the segment of focus indicated in red (all figures are included at the end of the report). The City of Lynn is pursuing redevelopment of the Lynn Waterfront, and because of this mission it conducted a comprehensive Masterplan for the waterfront in 2007.<sup>9</sup> Presently, the Lynnway and Carroll Parkway present a barrier to connecting the Lynn downtown area to businesses and developments along the Lynn Waterfront. Safety for pedestrians and bicyclists using the Lynnway and Carroll Parkway is a major concern that affects development of the Lynn Waterfront. Lack of accommodations for bicycles and long crosswalks (as long as 100 feet) discourage pedestrians and bicyclists from using the roadway.

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<sup>3</sup> Safety Conditions: Location has a higher-than-average crash rate for its functional class, contains a Highway Safety Improvement Program (HSIP)-eligible crash cluster, contains a top-200 high crash location, or has a significant number of pedestrian and bicycle crashes (two or more per mile).

<sup>4</sup> Congested Conditions: Travel time index is at least 1.3.

<sup>5</sup> Multimodal Significance: Location carries bus route(s), is adjacent to a transit stop or station; supports bicycle or pedestrian activities or has an implementation project to support one or more of these activities; has need to accommodate pedestrians and bicyclists and improve transit; or high truck traffic serving regional commerce.

<sup>6</sup> Regional Significance: Location is in National Highway System; carries a significant portion of regional traffic (ADT >20,000); lies within 0.5 miles of EJ transportation analysis areas or zones; or is essential for the region's economic, cultural, or recreational development.

<sup>7</sup> Regional Equity: That is, it was important not to select 1) more than one location in a subregion and 2) a location in same subregion as in the preceding cycle of this study.

<sup>8</sup> Implementation Potential: Location is proposed or endorsed by its roadway administrative agency (agencies); proposed or endorsed by its subregion and is a priority for that subregion; or has strong support from other stakeholders.

<sup>9</sup> Sasaki Associates in collaboration with ZHA and GEI, Lynn Waterfront Master Plan Report, September 2007.

## 2.2 VISION FOR THE LYNN WATERFRONT

### 2.2.1 Redevelopment of the Waterfront

Over the past decade, during some of the most trying economic times, the City of Lynn made major progress by completing the physical and legal changes necessary to develop 305 acres of its waterfront land, some of the most underutilized waterfront land along the entire US Eastern Seaboard. In June 2006, the city partnered with Sasaki Associates and implemented a comprehensive waterfront Master Plan and Municipal Harbor Plan that will guide development on these waterfront parcels:<sup>10</sup>

- More than four million square feet of residential development
- Almost two million square feet of commercial/retail, hotel, office and light industrial space
- About 45 acres designated as a port area, a boardwalk, marinas, and ample open public space

Staff estimate that a fully implemented plan and built-out waterfront would provide almost 10,000 construction jobs, 5,000 permanent jobs, and approximately \$18 million in annual property tax revenue

In addition, the City of Lynn implemented a comprehensive set of zoning regulations for this area that will transform the waterfront plans into easily understandable city ordinances, streamlining the permitting process by which development can occur. The city, through the Economic Development Industrial Corporation (EDIC), finished and implemented an MBTA ferry terminal and service, designed to supplement the existing MBTA commuter rail and bus service, and situated it within 100 yards of the waterfront. The area has also been classified a Commonwealth of Massachusetts Growth District, an important designation for older urban cities in need of increased tax bases and commercial and residential development. The city partnered with National Grid, General Electric, and a number of other private entities to relocate two large 115 KV power lines that had been inhibiting waterfront development for more than 40 years. Together, these actions have resulted in the sale of two major parcels of land—specifically, the so-called Beacon Chevrolet site and the General Electric (GE) Gear plant are under agreement and are now primed for development.

### 2.2.2 Access to Waterfront

The next major step is to create public access, transforming the waterfront into a vibrant destination point with direct linkage to Lynn's downtown and surrounding neighborhoods. The current configuration and size of the Lynnway inhibits

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<sup>10</sup> Ibid.

access to the waterfront—six-to-seven lanes of traffic act as a barrier, cutting off the waterfront from residents and tourists. Balancing the needs of vehicular commuters with the need for pedestrian and bicycle access to the waterfront is critical to making the city's vision a reality.

The proposed GE commuter rail stop and waterfront access from this stop across the Lynnway are necessary developments. Much like Storrow Drive and the Charles River, the city is envisioning a boardwalk along the full length of the waterfront; therefore, access from the other side of the Lynnway and Carroll Parkway is essential to its full use. In addition, the city anticipates that small retail businesses will continue to sprout up on the waterside of the Lynnway and that access will be essential to their sustainability. Thousands use the Lynn Ferry and thousands more would join them if access were more readily available via bicycle or on foot. Lastly, the need for safe havens in addition to overpasses is essential to the safety of those crossing the Lynnway. In all, access to the waterfront from neighborhoods and downtown is a vital component to the future of the City of Lynn.

## 2.3 STUDY GOALS AND OBJECTIVES

Figure 2 shows the land uses surrounding the Lynnway and Carroll Parkway, including the Lynn downtown area, neighborhoods, transportation centers and terminals, and the waterfront developments. Objectives of this study were to document existing problems, and develop multimodal improvements for them:

- Transform the Lynnway into a pedestrian- and bicyclist-friendly boulevard to create a walkable and livable community that promotes human interaction.
- Upgrade the traffic system to increase safety for all modes, including pedestrians, bicyclists, and motorists.
- Improve connectivity from Lynnway and Carroll Parkway to Lynn's downtown and neighborhoods, transportation centers, and the waterfront development.
- Improve access and mobility by moving people and goods efficiently across the corridor and local streets to support economic activities.
- Promote MassDOT's Healthy Transportation Compact by balancing vehicular traffic need with pedestrian and bicyclist needs.<sup>11</sup>

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<sup>11</sup> The Healthy Transportation Compact is a key requirement of the landmark transportation reform legislation signed into law in June 2009, to facilitate transportation decisions that balance the needs of all transportation users, expand mobility, improve public health, support a cleaner environment and create stronger communities.

The objectives include considering short- and long-term improvements that address Lynn's vision of the waterfront. Keeping in mind the problems in the arterial segment and the suggestions made by the study's task force, the study focused on evaluating roadway cross-sectional modifications to improve safety and mobility and make the roadway more accommodating for both pedestrians and bicyclists.

## 2.4 PUBLIC PARTICIPATION

An advisory task force—composed of representatives from Lynn, DCR, MAPC, MassDOT, and state legislators from Lynn—was established to participate in this study. MPO staff met with the task force twice: the first meeting discussed the work scope and existing problems, such as lack of accommodation for bicyclists, long crosswalks, lack of pedestrian refuge areas, high speeds of vehicles, and the Lynnway presenting a barrier between the Lynn Waterfront and downtown and neighborhoods. The second meeting presented the existing conditions, analyses and improvements and obtained comments. This report reflects the task force's feedback. Appendix A includes a list of task force members and their comments.

# Chapter 3—Characteristics of the Corridor

## 3.1 ROADWAY

The Lynnway and Carroll Parkway corridor, approximately two miles long, is a six-lane divided roadway with turn lanes and a median at designated locations. Figure 3 shows the map of the study area. The two roadways create a continuous artery, and thus are both directionally designated as north-south principal arterial roadways under the jurisdiction of the DCR. They connect several communities to the north of Lynn, including Swampscott, Salem, Marblehead, and Nahant, as well as several communities to the south of Lynn, such as Revere, Boston, Chelsea, and Everett. In addition, the roadways provide access to Lynn's downtown area, neighborhoods, transportation centers and a ferry terminal close to the study area. The roadways are classified as "urban principal arterial" on the National Highway System (NHS) program, making them eligible for federal funds. The right-of-way varies between 100 and 110 feet wide, the posted speed limit is 35 miles per hour (mph) in both directions and the land uses adjacent to the roadway are mixed—commercial, residential, and recreational. The following characterizes the current conditions in the corridor:

- Sidewalks on both sides of the Lynnway and Carroll Parkway are located close to the back of curbs, which places pedestrians close to the travel lanes.
- The six travel lanes result in a wide roadway, which encourages higher vehicle speeds during off-peak periods and places motorists, pedestrians, and bicyclists at risk. It also creates inequity by placing more emphasis on vehicular use rather than pedestrian and bicycle use.
- The lack of trees in the Lynnway portion of the corridor, which would create a separation between pedestrians and vehicles, encourages high vehicular speeds, reduces pedestrian comfort, and does not provide a welcoming environment for pedestrians and bicyclists.
- Long crosswalks and a lack of pedestrian refuge areas create long crossing times and unsafe conditions.
- High vehicular speeds put users at risk, especially pedestrians and bicyclists.
- Obstructions in crosswalks, non-compliant ADA curb ramps, and broken sidewalks create an unfriendly environment for pedestrians.
- A lack of shoulders makes the roadway uncomfortable for bicyclists and forces them to use the sidewalks instead.

## 3.2 MAJOR INTERSECTIONS

Several minor arterials and collector roadways intersect the Lynnway and Carroll Parkway, resulting in seven signalized intersections and a rotary along the corridor, which are described below.

### 3.2.1 Hanson Street Intersection

Hanson Street is a city-owned local street that intersects the Lynnway to form a three-leg signalized intersection, as shown in Figure 4. Each of the Lynnway's approaches has three through lanes. An exclusive left-turn lane has been provided on the southbound Lynnway approach for access to the businesses on Hanson Street. Hanson Street has two lanes at the approach: one for turning left and one for turning right. The intersection has a fully actuated traffic signal with functioning pedestrian signals with pushbuttons for crossing the Lynnway. The traffic signal heads are a mixture of mast-arm and post mounts. A bus stop is located at the intersection in each direction of the Lynnway; however, only the northbound side has a bus shelter with a bench. Walmart, Pride Hyundai and KIA, Dollar Tree, and several automobile service shops are located at the intersection.

### 3.2.2 Harding Street Intersection

Harding Street is a city-owned local street that intersects the Lynnway to form a four-leg signalized intersection (Figure 4). Each of the Lynnway's approaches has three through lanes and an exclusive left-turn lane. Each approach on Harding Street has two travel lanes: on the westbound approach (one for left/through turns and one for right turns) and on the eastbound approach (one for left turns and one for through/right turns). The intersection has a fully actuated traffic signal and the signal heads are a mixture of mast-arm and post mounts. There are crosswalks with curb ramps for crossing Harding Street, but there is no crosswalk across the busy Lynnway. The intersection lacks pedestrian signals. A bus stop is located in each direction of the Lynnway, but only the one on the northbound side has a shelter with a bench. The intersection curb radii are adequate for trucks and buses servicing commercial and retail businesses in the area. Pride Chevrolet, Atlantic Toyota and Scion, a Mobil gas station and a KFC restaurant are located at the intersection. In the future, Harding Street could be extended and improved to provide direct connection to the proposed GE commuter rail station and to the waterfront.

### 3.2.3 Commercial Street Intersection

Commercial Street is a city-owned minor arterial that intersects the Lynnway to form a four-leg signalized intersection, as shown in Figure 4. The intersection is one of the critical intersections in the corridor (high traffic volumes on both streets). Near the intersection, Lynnway has four lanes on each approach: on the northbound approach (exclusive left-turn lane and three through lanes) and on the southbound approach (exclusive right-turn lane and three through lanes). Commercial Street provides direct access from the Lynnway to the residential areas west of the roadway and downtown Lynn; it has three travel lanes on the eastbound approach (exclusive left-turn lane, through lane, and exclusive right-turn lane). There is no westbound approach on Commercial Street because of the one-way outbound movement. The intersection has a fully actuated traffic signal and the signal heads are a mixture of mast-arm and post mounts. The intersection is equipped with functioning pedestrian signals and crosswalks with curb ramps at all corners. One bus stop is located in each direction of the Lynnway, but neither of them has a shelter. The intersection curb radii are adequate for trucks and buses servicing commercial and retail businesses in the area. The land uses in the vicinity are commercial: among the businesses located at the intersection are Shell and Spiro gas stations, Kelly Honda, Sleepy's, and Midas Automotive Service.

### 3.2.4 Shepard Street/Marine Boulevard Intersection

Shepard Street and Marine Boulevard are city-owned local streets that intersect the Lynnway to form a four-leg signalized intersection, as shown in Figure 4. Each Lynnway approach has four lanes (exclusive left-turn lane and three through lanes). Shepard Street has one lane for all traffic movements and Marine Boulevard has two travel lanes at the approach: one for turning left and one for through/right turns. The intersection is equipped with a fully actuated traffic signal with functioning pedestrian signals for crossing the Lynnway. The signal heads are a mixture of mast-arm and post mounts. There are crosswalks with curb ramps for crossing Shepard Street and Marine Boulevard but they lack pedestrian signals with pushbuttons. One bus stop is located in each direction of the Lynnway, but neither of them has a shelter. Marine Boulevard provides access to the industrial area located east of the Lynnway; the intersection curb radii are adequate for trucks and buses. The land uses near the intersection are commercial and industrial: Honey Dew, Lynnway Mini Mall, and Harbor Place Mall are located close to the intersection on the west side of the Lynnway, and an industrial area is located at the waterfront.

### 3.2.5 Blossom Street Intersection

Blossom Street is a city-owned major collector that, because of the Lynnway's median, intersects the Lynnway to form two unsignalized T-intersections. Each of the Lynnway's approaches has three through lanes and each approach of Blossom Street has one lane servicing all movements. There are crosswalks with curb ramps for crossing Blossom Street, but the Lynnway has no crosswalks. One bus stop is located in each direction of the Lynnway, but only the bus stop on the northbound side has a shelter with a bench. The intersection curb radii are adequate for trucks and buses servicing commercial businesses in the area. The land uses in the area are commercial and industrial services—Wendy's, Dunkin' Donuts, and Ferguson Showroom and Supplies are located at the intersection. In addition, the Lynn Ferry terminal is located on Blossom Street, about 800 feet from the intersection.

Because of the raised median at the intersection, only right-in right-out movements are allowed on Blossom Street. The operation results in circuitous traffic circulation for the thousands of commuters accessing or exiting the ferry terminal. A lack of crosswalks also puts pedestrians at risk when they try to cross the Lynnway to the business areas. There is a strong need to open the median on the Lynnway, add left-turn lanes and crosswalks, and signalize the intersection to provide safe and direct access to the ferry terminal. Pedestrian access to the businesses located at the intersection also would be enhanced by installing a crosswalk.

### 3.2.6 Kingman Street Intersection

Kingman Street is a city-owned local street that intersects the Lynnway to form a T-intersection with modifications to allow northbound U-turns and access to businesses located on the west side of the intersection (Figure 4). Each of the Lynnway's approaches has four lanes (exclusive left-turn lane and three through lanes). There are two lanes for traffic exiting from Kingman Street (exclusive right-turn lane and shared through/left-turn lane). The intersection has a fully actuated traffic signal with functioning pedestrian signals with pushbuttons. The signal heads for the traffic movements are a mixture of mast-arm and post-mounts. There are crosswalks with curb ramps for crossing the Lynnway and Kingman Street. A bus stop is located in the southbound direction of the Lynnway but not in the northbound direction. The intersection curb radii are adequate for trucks and buses. The land uses in the area are commercial, retail, and professional services: the Clocktower Business Center, Dunkin' Donuts, and U-Haul are located at the intersection.

### 3.2.7 Market Street Intersection

Market Street is a city-owned minor arterial that intersects the Lynnway and Carroll Parkway to form a T-intersection, as shown in Figure 4. It is a gateway to the Lynn downtown area. Each of the Lynnway and Carroll Parkway approaches has three through lanes. In addition, the Lynnway's northbound approach has two exclusive left-turn lanes and the southbound approach of the Carroll Parkway has an exclusive right-turn lane. Market Street has two lanes on the approach; both are for turning left onto Carroll Parkway. The intersection has a fully actuated traffic signal with functioning pedestrian signals for crossing the Carroll Parkway and Market Street. The signal heads are a mixture of mast-arm and post mounts on the median and on the sidewalks. The intersection curb radii are adequate for trucks and buses. The land uses near the intersection are recreational and educational: the intersection provides access to the Lynn downtown area, North Shore Community College, Lynn Heritage Park, and the Lynn Waterfront.

### 3.2.8 Nahant Rotary

The Nahant Rotary is a three-leg intersection, as shown in Figure 4. It is the intersection of Carroll Parkway, Lynn Shore Drive and Nahant Road. At the rotary Carroll Parkway has three lanes (exclusive right turn lane and two left turn lanes); Lynn Shore Drive and Nahant Road has two lanes on each approach. There are crosswalks with curb ramps on each leg of the rotary; two of the crosswalks (on Carroll Parkway and Lynn Shore Drive) are controlled with pedestrian signals. The land uses near the rotary are recreational and residential—Lynn Shore and Nahant Beach are located close to the intersection.

### 3.2.9 Broad Street (Route 1A) and Market Street Intersection

Broad Street is a city-owned minor arterial that intersects Market Street to form a four-leg signalized intersection (not shown in Figure 4 because of limited space). It is located about 350 feet west of the Lynnway and Carroll Parkway in the downtown area. The Market Street northbound approach has three lanes (exclusive right-turn lane, through lane, and shared through/left-turn lane) while the southbound approach has two lanes (shared through/left-turn lane and shared through/right-turn lane). Broad Street's westbound approach has three lanes (exclusive right-turn lane, through lane, and shared through/left-turn lane). The intersection has a fully actuated traffic signal with functioning pedestrian signals for crossing at the intersection. The signal heads are a mixture of mast-arm and post mounts. There are crosswalks with curb ramps at all corners of the intersection. The intersection curb radii are adequate for trucks and buses. The land uses near the intersection are recreational, educational, and professional services. The North Shore Community College, Lynn Heritage Park, and the

Central Square-Lynn commuter rail station and busway are located at or near the intersection.

### 3.2.10 Broad Street, Washington Street, and Spring Street Intersection

Washington Street is a city-owned minor arterial that intersects Broad Street to form a complex five-leg signalized intersection (not shown in Figure 4 because of limited space). At the intersection, each approach of Broad Street has two lanes (shared through/left-turn lane and shared through/right-turn lane). Washington Street northbound has two lanes on its approach (exclusive left-turn lane and shared through/right-turn lane), while the southbound approach is a one-way street heading to the intersection. Spring Street is a two-way, two-lane street. The intersection has a fully actuated traffic signal with functioning pedestrian signals for crossing at the intersection. The signal heads are mixture of mast-arm and post mounts. There are crosswalks with curb ramps at all corners of the intersection and the curb radii are adequate for trucks and buses. The land uses near the intersection are recreational, educational, and professional services. The North Shore Community College, Lynn commuter rail station, Harbor Loft Apartments, and the Lynn Museum and Historical Society are located at the intersection.

# Chapter 4—Existing Transportation

## 4.1 HIGHWAY

The MassDOT Highway Division's Traffic Data Collection Section performed turning-movement counts (TMCs) at the study area's signalized intersections in May 2015, while schools were in session. The counts were conducted during the weekday AM peak travel period (7:00 AM–9:00 AM), the PM peak travel period (4:00 PM–6:00 PM), and the Saturday midday travel period (12:00 AM–2:00 PM). Heavy vehicles such as school buses, transit buses, and trucks were counted separately. Pedestrian and bicycle counts were conducted simultaneously with the TMCs.

In addition, MassDOT Highway Division's Traffic Data Collection Section conducted automatic traffic recorder (ATR) counts at seven locations on the Lynnway, Carroll Parkway, Broad Street, Washington Street, Nahant Road and Lynn Shore Drive. The ATR counts are continuous 48-hour traffic counts used to determine the average weekday traffic (AWDT) of a roadway. MassDOT Highway Division Traffic Data Collection Section also collected spot speed data at three locations on the Lynnway and Carroll Parkway. Similar to the ATR counts, the spot speed data are continuous 48-hour records. The TMC, AWDT, and spot speed data are included in Appendix B.

### 4.1.1 Vehicle Traffic Volumes

Figure 5 shows the AWDT at selected locations in the study area. The AWDT on the Lynnway ranges between 41,000 and 44,000 vehicles per day and between 30,000 and 33,000 vehicles on Carroll Parkway. Figure 6 shows the daily distribution of the hourly traffic volumes at three locations on the Lynnway and Carroll Parkway. The distributions show peak-period volumes in the range of 1,800 to 2,300 vehicles per hour in the southbound direction during the AM peak period and about the same volume in the northbound direction during the PM peak period. Outside of the four-hour AM and PM peak periods, the traffic volumes in each direction of the Lynnway and Carroll Parkway are less than 1,600 vehicles per hour. The theoretical capacity of a six-lane roadway is about 2,200 to 2,400 vehicles per hour per direction, and for a four-lane roadway capacity is about 1,600 to 1,800 vehicles per hour per direction. In other words, the Lynnway and Carroll Parkway have excess capacity during off-peak periods.

#### 4.1.2 Turning Movement Volumes

Figure 7 shows the turning movement volumes at the major intersections during the weekday AM peak hour (7:00–8:00 AM), weekday PM peak-hour (4:45–5:45 PM), and Saturday PM peak (12:00–1:00 PM). Based on the peak turning movement volumes, MPO staff determined that:

- The majority of traffic in the corridor is pass-thorough commuter traffic.
- The peak flow direction is southbound during the AM peak period and northbound during the PM peak period.
- The critical intersections controlling traffic flow in the corridor and with a significant proportion of turning movements are:
  - Lynnway and Market Street
  - Lynnway and Commercial Street
  - Lynnway and Hanson Street

#### 4.1.3 Pedestrian Traffic Volumes

Figure 8 presents the number of pedestrians observed at the major intersections during the two-hour AM and two-hour PM peak periods on a weekday and the two-hour peak period on Thursday, May 28 and Saturday, May 30, 2015. These volumes may be low because of the colder weather in May and the high traffic volume during peak periods. Nonetheless, the retail, commercial, industrial, and recreational services, office buildings, and ferry and bus transit services along the Lynnway and Carroll Parkway generated significant pedestrian activity in the corridor, especially at the following intersections: Hanson Street, Harding Street, Commercial Street, Blossom Street, Kingman Street, Pleasant Street and Nahant Rotary.

#### 4.1.4 Bicycle Traffic Volumes

Figure 9 presents the number of bicyclists observed at the major intersections, during the two-hour AM and two-hour PM peak periods on a weekday and the two-hour peak period on Thursday, May 28 and Saturday, May 30, 2015. These volumes may be low because of the colder weather in May, high traffic volume during peak periods, and the lack of amenities that provide safety and comfort for bicyclists, such as functioning shoulders or bicycle lanes. In addition, the roadway setting of the Lynnway and Carroll Parkway is unfriendly and intimidating to bicyclists, as the six-lane roadway encourages high vehicular speeds, making bicycling unsafe. In addition, the high number of heavy vehicles exacerbates the existing problems. Despite these adverse conditions, the counts indicate moderate bicycle volumes in the corridor, the majority of which were observed riding on the sidewalk.

#### 4.1.5 Heavy-Vehicles Volumes

The percentage of heavy vehicles (light goods, buses, single-unit trucks, and articulated trucks) in the study-area intersections ranges between 8.0 and 11.0 percent on a weekday and between 6.0 and 9.0 percent on a Saturday. These rates are considered particularly high for peak-period traffic conditions. The percentages of heavy vehicles are included in the TMC (Appendix B).

#### 4.1.6 Spot Speeds

Figure 10 shows the results of the spot speed data collected on the Lynnway and Carroll Parkway. The average spot speeds observed in the corridor range between 33 and 36 mph, identical to the 35 mph posted speed limit. In addition, 85 percent of the drivers travel at 42 mph or slower. The spot speed data indicated that the majority of drivers—about 62 percent—travel between 30 mph and 40 mph, which is known as the 10-mph-pace speed. Analysis shows that between 10 and 15 percent of drivers travel in the 45-to-55 mph range, which is considerably higher than the posted speed limit.

#### 4.1.7 Signal Timing and Layout Information

DCR provided the existing signal timings, already-built traffic signal plans, and signal phase sequences of the signalized intersections (included in Appendix C). MPO staff used Google Maps and field visits to identify recent modifications to the intersection layouts and signal plans. The information was used to analyze existing traffic operations conditions.

### 4.2 TRANSIT

There are several public transportation services close to the Lynnway, including bus, commuter rail, ferry, and subway (Blue Line) services. These are displayed in Figure 11, a transit service map.

#### 4.2.1 Bus Service

The MBTA operates six bus routes along the Lynnway:

- Route 426: Central Square Lynn - Haymarket or Wonderland Station
- Route 439: Bass Point Nahant - Central Square Lynn
- Route 441: Marblehead - Haymarket or Wonderland Station via Paradise Road
- Route 442: Marblehead - Haymarket or Wonderland Station via Humphry Street
- Route 448: Marblehead - Downtown Crossing
- Route 449: Marblehead - Downtown Crossing

These bus services connect Lynn and nearby communities to Central Square Station on the Newburyport Commuter Rail Line, Wonderland Station on the Blue

Line, and Downtown Boston, including South Station. Routes 441, 442, 448, and 449 operate Monday through Friday every 10 minutes from 5:13 AM to 12:28 AM and Saturday through Sunday every 30 minutes from 6:06 AM to 12:39 AM.

Route 439 operates only on weekdays, with five trips from Bass Point to Lynn at 6:30 AM, 7:30 AM, 2:25 PM, 6:05 PM and 6:52 PM; and five trips from Lynn to Bass Point at 6:15 AM, 7:10 AM, 2:08 PM, 5:44 PM, and 6:32 PM. The schedules of the six bus routes are included in Appendix D.

On the Lynnway, there are six bus stops in the northbound direction and nine in the southbound direction. Three of the bus stops in the northbound direction have shelters equipped with benches but none in the southbound direction have either. The lack of bus shelters creates inconveniences for passengers, especially during inclement weather. Table 1 below shows the bus service performance evaluation of each route in terms of service objectives: span, frequency, loading, schedule adherence, daily ridership, and average number of passengers per trip. The evaluation is based on the 2010 service delivery policy standard and spring 2011 schedule.

**TABLE 1**  
**Bus Service Evaluation, 2010–11**

Route Number	Route Description	Span	Fre-quency	Load-ing	Schedule Adherence	Daily Ridershi-p	Average Number of Passengers per Trip
426	Central Square Lynn - Haymarket or Wonderland Station	Pass	Pass	Pass	55.0%	2,006	28
439	Bass Point Nahant - Central Square Lynn	Pass	Pass	Pass	63.0	88	5
441	Marblehead - Haymarket or Wonderland Station via Paradise Road	Pass	Fail	Fail	49.0	1,442	37
442	Marblehead - Haymarket or Wonderland Station via Humphrey Street	Pass	Fail	Fail	52.0	2,112	28
448	Marblehead - Downtown Crossing	Fail	Pass	Pass	49.0	162	32
449	Marblehead - Downtown Crossing	Fail	Pass	Pass	52.0	181	30

Notes: "Pass" means the bus service meets the performance standards established for that service objective. "Fail" means the bus service does not meet the performance standards established for that service objective. "Span" is based on the 2010 service delivery policy standard for the route type and spring 2011 schedule; correcting this failure would always require additional resources. "Frequency" is based on 2010 service delivery policy standard for the route type and spring 2011 schedule; correcting this failure would always require additional resources. "Loading" is based on the 2010 service delivery policy and same ridership data used above; standard is less than 140% of seated load averaged over 30-minute period during peak periods and less than 100% of seated load averaged over 60-minute period during off-peak periods; correcting this failure would always require additional resources. "Schedule Adherence" is based on the 2010 service delivery policy (definition of this service objective varies by frequency of service and time point crossings for start/mid/endpoints of the bus route); percentage shown is the proportion of all time point crossings during fall 2010, which were on time; goal is 75 percent on time. Correcting this failure would NOT always require additional resources.  
Source: Massachusetts Bay Transportation Authority.

Based on the performance evaluation presented in Table 1:

- Routes 426, 441, and 442 have a high level of ridership; together they carry about 5,560 passengers daily.
- Routes 441 and 442 fail the frequency and loading standard and require additional resources.
- Routes 448 and 449 fail the span standard and require additional resources.
- All of the routes have a schedule adherence performance of between 49 and 63 percent, which implies that they meet on-time performance no more than 63 percent of the time.

#### 4.2.2 Ferry Service

The Lynn Ferry service is a partnership between the Economic Development Industrial Corporation of Lynn (EDIC) and Boston Harbor Cruises. The service completed a two-year pilot program that started in 2014 and ended in 2016.

Ridership in the first year of operation exceeded the projected estimate of 10,000 by more than 3,000 and much better success is expected in the second year of operation. The ferry operates seasonally, starting in May and running throughout the remainder of spring and summer, with stops at Blossom Street Landing (just off the Lynnway) and Central Wharf in Boston. There is ample free parking at the Blossom Street Landing and the trip takes about 30 minutes. The ferry service operates Monday through Friday with three departure trips from Lynn at 6:30 AM, 8:00 AM, and 6:30 PM; and three return trips from Central Wharf at 7:15 AM, 5:45 PM, and 7:15 PM. Information about ferry tickets and fares is included in Appendix D.

Currently, a raised median on the Lynnway at the Blossom Street intersection makes access to and from the Lynn Ferry terminal on Blossom Street difficult, as it prevents drivers from turning left onto Blossom Street. The raised median forces drivers southbound on the Lynnway heading to the ferry terminal to proceed to the Shepard Street/Marine Boulevard intersection then make a U-turn at the intersection and proceed back to Blossom Street in order to access the ferry terminal. Similarly, drivers from the ferry terminal heading to Commercial Street, Shepard Street, and Blossom Street have to proceed northbound on Lynnway to Kingman Street intersection, make a U-turn at that intersection, then continue southbound on the Lynnway in order to access those streets. These maneuvers put drivers and the growing number of commuters using the ferry terminal at risk.

In addition, many pedestrians and bicyclists cross the Lynnway at the Blossom Street intersection to access businesses located at the intersection and the ferry terminal. The absence of a pedestrian signal and marked crosswalks across the Lynnway compel pedestrians and cyclists to go to the adjacent signalized intersections in order to cross the busy Lynnway safely and legally, a maneuver which increases delay for pedestrians and bicyclists because of the extra distance involved. Therefore, many pedestrians and bicyclists still choose to cross the Lynnway at Blossom Street, which puts them at risk. These challenges to drivers, pedestrians, and bicyclists support the need for short-term improvements that will open the median at Blossom Street to provide safe and direct access to the ferry terminal and the businesses located at the intersection.

#### 4.2.3 Commuter Rail Service

The MBTA Newburyport/Rockport Line has a station in Lynn at Central Square on Market Street. This MBTA station (just off the Lynnway) is also a transportation center connecting passengers to several bus lines. The commuter rail operates a full schedule Monday through Friday from 5:00 AM to 12:10 AM and an abbreviated service on Saturday and Sunday from 7:00 AM to 11:30 PM (the full train schedules are included in Appendix D). Peak-period frequency for both the inbound and outbound trains is approximately 30 minutes. The typical weekday boarding (inbound trains) at the station is about 700-to-800 passengers. There is parking at the Central Square station with 965 spaces, of which 23 are ADA accessible. The parking rate is \$4.00 daily and the average weekday availability is 79 percent (very low utilization rate compared to the parking facilities at many other stations in the MBTA system).

There is also a plan to convert the GE commuter rail station, which currently serves only GE employees, into a full station servicing the future waterfront development. Connections from the Lynnway to the proposed GE commuter rail station and the waterfront development would be needed in order to provide direct and safe access amongst and between these locations.

# Chapter 5—Existing Conditions Analyses

## 5.1 SAFETY ANALYSIS

MPO staff used crash data from MassDOT's Registry of Motor Vehicles database for January 2010 through December 2012 to evaluate safety for motorists, pedestrians, and bicyclists in the study area. The following sections describe the analyses and results of this safety assessment.

### 5.1.1 Segment Crash Summary

Table 2 presents a crash summary that identifies severity; manner of collision; road-surface, ambient-light, and weather conditions; number of bicyclists and pedestrians involved; and time of occurrence. The crash data is included in Appendix E.

**TABLE 2**  
**2010–12 Segment Crash Summary**

Crash Variable	Lynnway	Carroll Parkway
<b>Crash Severity</b>	--	--
Fatal injury	2	0
Non-fatal injury	52	12
Property damage only	136	23
Unknown/not reported	10	6
<b>Manner of Collision</b>	--	--
Rear-end	78	12
Angle	56	4
Single vehicle crash	32	17
Sideswipe, same direction	23	8
Head-on	4	0
Sideswipe, opposite direction	2	0
Not reported/unknown	5	0
<b>Road Surface Conditions</b>	--	--
Dry	150	33
Wet	41	8
Sand, mud, dirt, oil, gravel, water, slush	2	0
Snow	4	0
Not reported	3	0
<b>Ambient Light Conditions</b>	--	--
Daylight	145	27
Dark with lighted roadway	39	13
Dark with roadway not lighted	3	0
Dawn	4	1
Dusk	5	0
Not reported/unknown	4	0

<b>Crash Variable</b>	<b>Lynnway</b>	<b>Carroll Parkway</b>
<b>Weather Conditions</b>	--	--
Clear	103	22
Cloudy	27	4
Rain	19	4
Snow/ice/freezing rain	7	1
Not reported/unknown	44	10
<b>Bicyclists and Pedestrians Involved</b>	--	--
Bicyclist	7	1
Pedestrian	11	1
<b>Time Period</b>	--	--
Peak period	39	4
Off-peak period	161	37
<b>Total crashes</b>	<b>200</b>	<b>41</b>
<b>Three-year average (rounded)</b>	<b>67</b>	<b>13</b>
<b>Segment crash rate</b>	<b>3.23</b>	<b>2.49</b>
<b>Principal arterial (other)—average statewide crash rate</b>	<b>3.35</b>	<b>3.35</b>

Note: The AM peak period is 7:00 AM–9:00 AM; PM peak period is 4:00 PM–6:00 PM.

Source: Central Transportation Planning Staff.

Between 2010 and 2012, there were 241 crashes on the Lynnway and Carroll Parkway, involving 453 vehicles. These crashes resulted in 84 injuries (two of them fatal), meaning that injury crashes represent approximately 30 percent of crashes overall. The predominant crash types were rear-end, angle, single-vehicle crash, and same-direction sideswipe. Together, the crashes of these types constitute more than 94 percent of the crashes in the corridor. Many of these crashes occurred because of motorists running red lights, failing to yield right-of-way, following too close, and being inattentive or distracted. The segment crash rates for the Lynnway and Carroll Parkway were 3.23 and 2.49 crashes per million vehicles-miles traveled (MVMT), respectively. The most recent 2012 statewide average crash rate for an urban principal arterial is 3.35 crashes per MVMT.<sup>12</sup> Overall, the segment crash rate for the Lynnway is close to the statewide average crash rate, but the segment crash rate for the Carroll Parkway is below the statewide average.

### 5.1.2 Intersection Crash Summary

Figure 12 shows automobile, bicycle, and pedestrian crashes at the major intersections. Motorists, pedestrians, and bicyclists are exposed to risk because of the roadway design.

- The intersections with the highest concentration of automobile crashes are: Lynnway and Hanson Street, Lynnway and Commercial Street,

<sup>12</sup> Published by MassDOT based on crash information queried on August 13, 2014.

Carroll Street at Nahant Road and Lynn Shore Drive, Broad Street and Market Street, and Broad Street and Washington Street.

- The intersections with the greatest concentration of pedestrian and bicycle crashes are Lynnway and Hanson Street, Lynnway and Commercial Street, Broad Street and Market Street, and Broad Street and Washington Street.

Table 3 presents a summary of crashes at the major intersections in terms of severity; manner of collision; road-surface, ambient-light, and weather conditions; number bicycles or pedestrians involved; and time of occurrence. For MassDOT Highway Division District 4 (which includes the City of Lynn), the average crash rate for signalized intersections is 0.73 crashes per million entering vehicles (MEV) and 0.56 MEV for unsignalized intersections.<sup>13</sup> The crash rate worksheets are presented in Appendix F.

The analyses presented in Table 3 indicate higher-than-average crash rates for the following intersections:

- Lynnway and Commercial Street intersection (Highway Safety Improvement (HSIP) crash cluster)
- Lynnway and Kingman Street intersection
- Carroll Parkway at Nahant Rotary (HSIP crash cluster)

As noted, two of the three intersections with high-crash rates (Lynnway and Commercial Street intersection and Carroll Parkway at Nahant Rotary) are on the list of the HSIP crash clusters and are eligible for HSIP funding. Based on the HSIP crash-cluster status, they also would require a road safety audit (RSA) to discuss additional safety countermeasures. An HSIP-eligible cluster is one in which the total number of "equivalent property damage only" crashes in the cluster is within the top five percent of all clusters in that region<sup>14</sup>.

**TABLE 3**  
**2010–2012 Crash Summary: Study Intersections**

Characteristics	Hanson Street	Harding Street	Commercial Street	Marine Blvd.	Kingman Street	Market Street	Nahant Rotary
<b>Crash Severity</b>	--	--	--	--	--	--	--
Fatal injury	2	0	0	0	0	0	0
Non-fatal injury	12	3	13	3	13	5	7
Property damage only	15	19	44	12	31	14	20
Not reported/unknown	2	4	2	1	1	0	6
<b>Manner of Collision</b>	--	--	--	--	--	--	--
Angle	10	4	23	4	11	2	3
Rear-end	7	16	21	6	18	9	8
Sideswipe, opposite	1	0	1	0	0	0	0

<sup>13</sup> Published by MassDOT based on crash information queried on January 23, 2013.

<sup>14</sup> "Equivalent property damage only" is a method of combining the number of crashes with the severity of crashes based on a weighted scale where a fatal crash is worth 10, an injury crash is worth 5, and a property-damage-only crash is worth 1.

<b>Characteristics</b>	<b>Hanson Street</b>	<b>Harding Street</b>	<b>Commercial Street</b>	<b>Marine Blvd.</b>	<b>Kingman Street</b>	<b>Market Street</b>	<b>Nahant Rotary</b>
direction							
Sideswipe, same direction	2	3	3	3	6	5	8
Single vehicle collision	8	2	9	2	8	3	14
Head-on	0	1	2	1	0	0	0
Not reported/unknown	3	0	0	0	2	0	0
<b>Road Surface Conditions</b>	--	--	--	--	--	--	--
Dry	23	20	44	10	37	14	27
Wet	5	6	13	5	6	5	6
Snow	1	0	1	1	2	0	0
Not reported/unknown	2	0	1	0	0	0	0
<b>Ambient Light Conditions</b>	--	--	--	--	--	--	--
Daylight	24	17	45	12	35	8	22
Dark with lighted roadway	1	8	11	3	9	7	11
Dark with roadway not lighted	1	0	0	0	1	1	0
Dawn	1	0	2	0	0	1	0
Dusk	0	1	1	1	0	2	0
Not reported/unknown	4	0	0	0	0	0	0
<b>Weather Conditions</b>	--	--	--	--	--	--	--
Clear	15	10	35	6	27	8	18
Cloudy	5	5	5	2	6	4	3
Rain	2	1	8	2	3	2	2
Snow	2	0	0	2	1	1	1
Not reported/unknown	7	10	11	4	8	4	9
<b>Bicyclists and Pedestrians Involved</b>	--	--	--	--	--	--	--
Bicyclist	0	0	3	0	0	0	1
Pedestrian	4	1	2	0	2	1	0
<b>Time Period</b>	--	--	--	--	--	--	--
Peak period	4	9	12	3	11	7	5
Off-peak period	27	17	47	13	34	12	28
<b>Total Crashes (2010-2012)</b>	<b>31</b>	<b>26</b>	<b>59</b>	<b>16</b>	<b>45</b>	<b>19</b>	<b>33</b>
<b>Three-year average crash rate</b>	<b>10</b>	<b>9</b>	<b>20</b>	<b>5</b>	<b>15</b>	<b>6</b>	<b>11</b>
<b>Average crash rate</b>	<b>0.71</b>	<b>0.57</b>	<b>1.07</b>	<b>0.35</b>	<b>0.93</b>	<b>0.45</b>	<b>0.89</b>
<b>MassDOT Highway Division District 4 average crash rate</b>	<b>0.73</b>	<b>0.73</b>	<b>0.73</b>	<b>0.73</b>	<b>0.73</b>	<b>0.73</b>	<b>0.56</b>

Notes: The AM peak period is 7:00 AM–9:00 AM; the PM peak period is 4:00 PM–6:00 PM.

Shading denotes an intersection with a high crash rate.

Source: Central Transportation Planning Staff.

### 5.1.3 Collision Diagrams

MPO staff used police crash reports to prepare collision diagrams, which are useful for examining patterns and developing safety strategies.<sup>15</sup> The collision diagrams, along with the crash records, are included in Appendix G. The collision

<sup>15</sup> Staff did not prepare diagrams for a few crash reports because they lacked police-drawn sketches showing how they occurred, and so those reports are not included in Figures 5 through 9.

diagram numbers uniquely identify each crash and may be used to cross-reference the crash records. According to the collision diagrams, rear-end and angle crashes, usually associated with signalized intersections, were the predominant crash type. Nine pedestrian crashes occurred at midblock locations on the Lynnway and two in crosswalks at intersections. Three bicycle crashes occurred in sidewalk locations with driveways. The roadway design is a major contributor to these crashes: it encourages high vehicular speeds, reduces pedestrian comfort, and does not provide a welcoming environment for pedestrians and bicyclists; and the long crosswalks and lack of pedestrian refuge areas create long pedestrian crossing times and unsafe crossing conditions.

## 5.2 TRAFFIC OPERATIONS ANALYSES

Staff conducted traffic operations analyses consistent with the Highway Capacity Manual (HCM) methodologies.<sup>16</sup> HCM methodology demonstrates driving conditions at signalized and unsignalized intersections in terms of a level-of-service (LOS) rating from A to F. LOS A represents the best operating conditions (little to no delay), while LOS F represents the worst operating conditions (long delay). LOS E represents operating conditions at capacity (limit of acceptable delay). Table 4 presents the control delays associated with each LOS for signalized and unsignalized intersections. Using the data collected, MPO staff built traffic analysis networks for the AM and PM peak hours and Saturday PM peak hour using Synchro traffic simulation software<sup>17</sup> to assess the capacity and quality of traffic flow.

**TABLE 4**  
**Intersection Levels of Service Criteria, 2010**

<b>Level of Service</b>	<b>Signalized Intersection Control Delay (seconds per vehicle)</b>	<b>Unsignalized Intersection Control Delay (seconds per vehicle)</b>
A	0-10	0-10
B	> 10-20	> 10-15
C	> 20-35	> 15-25
D	> 35-55	> 25-35
E	> 55-80	> 35-50
F	> 80	> 50

Source: Highway Capacity Manual 2010.

<sup>16</sup> Highway Capacity Manual 2010, Transportation Research Board of the National Academies, Washington, DC, December 2010.

<sup>17</sup> Trafficware Inc., Synchro Studio 8, Synchro plus SimTraffic, Build 801, Version 563, Sugar Land, Texas.

Figure 13 shows the existing lane configuration of the Lynnway and Carroll Parkway. Figures 14 through 16 show the results of the existing conditions analyses in terms of LOS and delays for the weekday AM, weekday PM and Saturday PM peak hours, respectively. The existing conditions LOS analysis worksheets are included in Appendix H. None of the intersections in the corridor appear to be failing. Delays and queues occur only during the peak periods at the following critical intersections, where the levels of service are still acceptable:

- Lynnway and Hanson Street during the weekday PM and Saturday PM peak periods because of the high volume heading northbound and the traffic turning left into the Walmart store or Lynnway Market.
- Lynnway and Commercial Street during the weekday AM, weekday PM, and Saturday PM peak periods. High volume of traffic at the intersection is the major cause of the delays.
- Lynnway and Market Street during the weekday PM peak period because of the high volume of left-turning traffic at the intersection.
- Nahant Rotary during the weekday PM peak period because of the high volume of traffic at the rotary

## 5.3 IDENTIFIED PROBLEMS

Based on analyzing the existing conditions, field reconnaissance, and task force discussions, the following problems were identified in the corridor.

### 5.3.1 Pedestrian and Bicyclist Issues

Figures 17 and 18, and the issues listed below, show some of the problems and challenges facing pedestrians and bicyclists and the reasons why the roadway is considered unfriendly for pedestrians and bicycles:

- Long crosswalks (as long as 100 feet) and inadequate median refuge area on the Lynnway make crossing a challenge and put pedestrians at risk.
- Sidewalks on the Lynnway and Carroll Parkway are located close to the back of curbs, placing pedestrians close to the travel lanes. A lack of trees in the Lynnway segment, which would serve to create a separation between pedestrians and vehicles, also reduces pedestrian comfort and does not provide a welcoming environment for pedestrians and bicyclists.
- Six-to-seven travel lanes results in a wide roadway, encouraging higher vehicle speeds and placing motorists, pedestrians, and bicyclists at risk. In addition, it creates inequity by placing too much emphasis on vehicular use rather than pedestrian and bicycle use.
- A lack of shoulders or bike lanes or shared-lane markings makes the roadway uncomfortable and unsafe for bicyclists and forces them to ride on the sidewalks instead.
- Pedestrian and bicyclist access to the Lynn Ferry terminal on Blossom Street and the businesses located near the Blossom Street intersection is

confusing to navigate and dangerous. There is no crosswalk across the Lynnway at the intersection: pedestrians and bicyclists must go to the adjacent signalized intersections about 600-to-700 feet away, which would result in a significant delay and therefore encourages them to cross the Lynnway unprotected, and unexpected by drivers.

- Obstructions in crosswalks, non-compliant ADA curb ramps, and broken sidewalks create an unfriendly environment for pedestrians, especially for people with disabilities.
- Pedestrian and bicyclist access to the businesses located at the Harding Street intersection is difficult because the intersection lacks a crosswalk across the Lynnway. The collision diagram in Appendix G shows a pedestrian-vehicle crash at the intersection.
- Many of the side streets at the unsignalized intersections lack stop signs, and at the signalized intersections some lack pedestrian signals with pushbuttons, both of which put pedestrians at risk.
- The absence of a sidewalk along the park located between Broad Street, Market Street, and the Lynnway limits pedestrian access and connection to the waterfront. There is a strong desire line<sup>18</sup>, which shows that people are walking along the Lynnway where no sidewalks are provided.
- The high volume of heavy trucks in the corridor poses safety problems for pedestrians and bicycles.

### 5.3.2 Traffic Safety and Operations Issues

- Access to the Lynn Ferry terminal is confusing to navigate and unsafe for drivers and commuters. The turn prohibition at the Blossom Street intersection creates overly complicated traffic circulation for drivers.
- High vehicular speeds result in many crashes involving motorists, pedestrians, and bicyclists throughout the corridor.
- Outdated signal-timing plans need to be updated to make the flow of traffic efficient.
- The substandard signal equipment reduces signal visibility and needs upgrades in order to be responsive to complex signal-timing plans and changing traffic flow patterns.
- The lack of an Opticom system to handle emergency vehicles obstructs emergency and rescue services.
- There are no transit priority signals, which would improve on-time performance for buses.
- The insufficient length of left-turn lanes creates traffic queues that spill over into through travel lanes, causing disruptions.

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<sup>18</sup> “Desire line” refers to a path worn into the ground by pedestrians who repeatedly take the same shortcut to get from one area to another.

- The high speed of drivers turning right from Carroll Parkway onto Market Street, because of a wide curb-line radius, puts pedestrians at risk.
- The high volume of traffic turning left off the Lynnway creates queue storage problems on northbound Market Street for the high volume of traffic turning right onto Broad Street.

### 5.3.3 Public Access Issues—Connections between the Waterfront Development and Lynn's Downtown and Neighborhoods

Developing the waterfront into a vibrant destination with direct linkage to Lynn's downtown and surrounding neighborhoods would require improvements to the Lynnway, Carroll Parkway and ancillary<sup>19</sup> local streets that accommodate all road users. Plans for the waterfront include residential development; retail stores; boardwalk, entertainment and recreation areas; and office parks. Residents and visitors to the waterfront would walk, bicycle, or drive. Hence, the following access issues need to be addressed in order to realize the city's vision for the waterfront.

- Renovate the Lynnway and Carroll Parkway to provide a pedestrian friendly roadway.
- Renovate the Lynnway and Carroll Parkway to accommodate bicycle use.
- Balance the needs of vehicular commuters with the need for pedestrian and bicycle access to the waterfront.
- Open the median at Blossom Street and signalize the intersection to provide safe and direct access to the Lynn Ferry terminal.
- Improve the strategic ancillary streets that connect the Lynnway and Carroll Parkway to transportation service centers, Lynn's downtown and neighborhoods, and the waterfront development in order to provide a safe and comfortable roadway experience for pedestrians and bicyclists. Candidate streets include Harding Street, Commercial Street, Marine Boulevard/Shepard Street, Blossom Street, Pleasant Street, Market Street, and Washington Street.
- Extend and renovate Harding Street to connect to the proposed General Electric commuter rail station and to the waterfront. Enhance pedestrian and bicycle access at the intersection to encourage pedestrians and bicyclists to walk or bike to the proposed commuter rail station and to the waterfront.
- Improve the bus transit service that connects Lynn Central Square Station and Wonderland Station to better serve businesses on the Lynnway and waterfront development. Improvements should include increased frequency; improved coordination among modes (buses, commuter trains, ferries); reduced delay to transit vehicles; and improved stops/shelters.

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<sup>19</sup> Ancillary streets are major side streets.

# Chapter 6—Short-Term Improvements

MPO staff worked with the study's advisory task force to develop short-term strategies for addressing the safety, operations, and access issues identified in the corridor. The time frame categorized as "short-term" is typically less than five years. In addition, short-term improvements are less complicated to perform and require a smaller amount of funding, design and engineering.

## 6.1 ALTERNATIVE 1: SHORT-TERM IMPROVEMENTS

Alternative 1 maintains the existing roadway cross-section and makes short-term improvements that address some of the issues affecting pedestrian and bicycle safety, access to the Lynn Ferry terminal, and traffic flow. Figure 19 shows some possible short-term improvements, which are described in detail in the following two sections; Figure 20 also illustrates short-term improvements that will be discussed as they become relevant. All of the improvements described are low- and medium-cost and can be implemented within one-to-five years using either maintenance funds or special funds.

### 6.1.1 Improvements throughout the Corridor

- Retime and coordinate traffic signals in the corridor using recent turning movement volumes—including those for pedestrians and bicycles—at the signalized intersections.
- Add backplates to the signal heads to improve visibility during sun glare. This would require a structural review of the signal equipment to ensure that it could accommodate the additional wind load.
- Convert curb lanes on Lynnway and Carroll Parkway into shared-use lanes. For example, reduce the existing lane widths to 10 feet in order to create 13-foot curb lanes for shared use by bicycles.
- Add advance street name, intersection, and wayfinding signs to guide drivers, bicyclists, and pedestrians through the corridor.
- Work with the City of Lynn, the MBTA, and business owners to increase number of bus shelters in the corridor, especially on the Lynnway southbound, and improve both service frequency and span for bus routes 441, 442, 448, and 449.
- Add countdown timers at the Lynnway intersections that have high volumes of pedestrians and bicycles, such as the intersections at Hanson Street, Commercial Street, Marine Boulevard/Shepard Street, and the Market Street Extension.
- Repair broken sidewalks and remove obstructions from crosswalks.

- Add detectable warning plates to curb ramps and ADA-compliant accessible pedestrian signals (APS).

### 6.1.2 Intersection-Related Improvements

#### *Hanson Street Intersection:*

- Add countdown timers for crossing the Lynnway.
- Work with MBTA to examine feasibility of adding a bus shelter on the southbound direction to complement the one installed on the northbound direction.

#### *Harding Street Intersection:*

- Remove portion of the median on the eastern leg of Harding Street that is blocking the crosswalk.
- Add a crosswalk on the Lynnway.
- Add countdown timers for crossing the Lynnway.

#### *Commercial Street Intersection:*

- Add countdown timers for crossing the Lynnway

#### *Marine Boulevard/Shepard Street Intersection:*

- Remove portion of the median on Marine Boulevard that is blocking the crosswalk.
- Add countdown timers for crossing the Lynnway.

#### *Blossom Street Intersection:*

- Open median, add a southbound left-turn lane, and signalize the Blossom Street intersection to provide safe and direct access to the Lynn Ferry terminal and the businesses located at the intersection. Figure 20 shows improvements that MPO staff recommend at the intersection.
- Install crosswalks on the Lynnway with pedestrian signals and pushbuttons to protect pedestrians and bicycles.
- Install bicycle detection equipment, pavement markings and signs to protect and guide bicyclists through the intersection.
- Install curb extensions or bulb-outs<sup>20</sup> to reduce the crosswalk distance on Blossom Street.

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<sup>20</sup> “Curb extensions (also called bulb-outs) extend or widen the sidewalk into the parking lane to narrow the roadway and provide additional pedestrian space at key locations; they can be used at corners and at mid-block. Curb extensions enhance pedestrian safety by increasing pedestrian visibility, shortening crossing distances, slowing turning vehicles, and visually narrowing the roadway.” (Source: <http://www.sfbetterstreets.org/find-project-types/pedestrian-safety-and-traffic-calming/traffic-calming-overview/curb-extensions/>)

***Kingman Street Intersection:***

- Add countdown timers for crossing the Lynnway.
- Relocate pedestrian signal with pushbutton closer to the curb ramps.

***Pleasant Street/Broad Street Intersection:***

- Add a marked crosswalk on Broad Street.

***Market Street Extension Intersection:***

- Remove the portion of the median on the Lynnway that is blocking the crosswalk.
- Add countdown timers for crossing the Lynnway.
- Install a sidewalk on the southbound Lynnway between the Market Street Extension and Broad Street.

### **6.1.3 Level of Service**

Figures 21 through 23 show the results of the LOS and delays analyses for the weekday AM and PM and Saturday PM peak hours. The results show that the Alternative 1 recommendations operate satisfactorily (LOS D or better for high-volume through traffic). The LOS analysis worksheets for Alternative 1 are included in Appendix I.

### **6.1.4 Advantages**

Alternative 1 has the following advantages:

- Addresses short-term improvements to increase safety for pedestrians and bicyclists.
- Improves access to the Lynn Ferry terminal and to the businesses located at the Blossom Street intersection.
- Makes traffic flow more efficient by retiming and coordinating signals.

### **6.1.5 Disadvantages**

Alternative 1 has the following disadvantages:

- Does not support long-term vision for the waterfront's development.
- Does not address connections amongst the waterfront, downtown and nearby neighborhoods.
- Does not renovate the Lynnway and Carroll Parkway in ways that provide a pedestrian-and-bicyclist-friendly roadway that accommodates all users safely.
- Does not include corridor-specific traffic-calming mitigation measures that would reduce traffic speeds.

### 6.1.6 Cost

Based on the reconstruction costs of similar past projects in the MassDOT project information database, MPO staff estimate Alternative 1 to cost approximately \$5-to-\$7 million. This cost estimate includes the elements described above, such as a new traffic signal at the Blossom Street intersection, new signal coordination, installation of signal head backplates, and improved signage. It includes safety improvements for pedestrians and bicycles, such as adding countdown timers and shared-use curb lanes, repairing broken sidewalks, and making ADA improvements, including removing obstructions from crosswalks, adding detectable warning plates to the curb ramps, and installing accessible pedestrian signals.

# Chapter 7—Long-Term Improvements

The time frame categorized as “long-term” is typically greater than five years and can be as long as 15 years. Long-term improvements are more complicated than their short-term counterparts are, and require more funding resources and design and engineering efforts. Because the waterfront area has been classified as a Commonwealth of Massachusetts Growth District and rezoned for commercial and residential development, the strategy for the Lynnway and Carroll Parkway renovations was to evaluate different roadway cross-sections to see what must be done in order to improve safety, operations, and access for all users to the waterfront, and to connect it with the downtown area and surrounding neighborhoods.

Based on discussions with the advisory task force, MPO staff have developed five long-term alternatives for consideration. Some of the alternatives have improvements that mostly fall within the existing roadway’s right-of-way width and take into account the needs of abutters and users (for example, Alternatives 2, 4, and 6). Other alternatives propose improvements that would require more space to build the improvements (such as Alternatives 3 and 5). All of the long-term alternatives would require the proposed land use changes at the waterfront area—for example, land uses that attract pedestrians and bicyclists, such as entertainment and recreation areas, residential and commercial developments, and office parks—in order to be successful.

For each of the long-term alternatives, staff recommend major landscape and streetscape improvements to make the Lynnway and Carroll Parkway more attractive to pedestrians and bicyclists, the aforementioned waterfront land use changes, and support improved connectivity from the waterfront to the Lynn downtown area and to the residential neighborhoods along the corridor.

## 7.1 ALTERNATIVE 2: ROAD DIET AND COMPLETE STREET

### 7.1.1 Roadway Setting

Alternative 2 would remove a travel lane in each direction on the Lynnway and Carroll Parkway and reconfigure the roadway to facilitate installation of a wider median (between 12 and 20 feet); wider sidewalks; shorter crosswalks with pedestrian refuge areas; and separated bicycle lanes; and introduce more landscaping and better streetscape design, as shown in Figure 24. The new streetscape would include bus shelters with benches, sidewalks with tree or grass buffers, and ornamental street lighting. Examples of model roadways would be the Veterans of Foreign War (VFW) Parkway in West Roxbury and the

Blue Hills Parkway in Milton, both of which are shown in Figure 25, among other examples.

Alternative 2 promotes renovation of the corridor to make it easier to walk and bike to the waterfront. The separated bicycle lanes would provide greater protection and higher visibility for both bicyclists and motorists, improving safety for all road users. The bicycle lanes would support connections to the proposed Bike-to-the-Sea trail<sup>21</sup> and proposed General Electric commuter rail station and encourage biking to the waterfront. Alternative 2 is multimodal and, in tandem with improved ancillary local streets, would fulfill the vision of connecting the waterfront to the Lynn downtown area, nearby neighborhoods, and the pertinent transportation service centers.

### 7.1.2 Operational Features

In addition to the renovation efforts discussed above, providing the following features would modernize the Lynnway and Carroll Parkway to increase safety and make the roadway efficient for all users:

- Upgrade signal equipment to MassDOT standards (consider adaptive traffic signal control system: this technology monitors traffic and adjusts the timing of red, yellow and green lights to accommodate changing traffic patterns and ease traffic congestion).
- Retime and coordinate signals.
- Install protected-permitted left-turn treatment.
- Add accessible pedestrian signals.
- Install detection for bicycles.
- Add Opticom system for handling emergency-vehicle preemption.
- Install transit signal priority to reduce bus service delays.
- Install advance street name signs to guide motorists.

### 7.1.3 Level of Service

Figures 26 through 28 show the resulting performance of Alternative 2 in terms of LOS and delays for the weekday AM and PM and Saturday PM peak hours. Appendix J includes the LOS worksheets for this alternative. The analyses show that with signal coordination, protected-permitted left-turn treatments, and concurrent pedestrian phases, Alternative 2 would operate satisfactorily (LOS D or better for the high volume of through traffic).

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<sup>21</sup> Bike-to-the-Sea trail is a multiuse path, free of cars, from the Malden/Everett area of Massachusetts to the beaches in Revere, Lynn and Nahant. It is still in construction and the section in Lynn has not been built.

Alternative 2 may reduce traffic volumes on the Lynnway and Carroll Parkway. Studies have shown that reducing roadway capacity to accommodate all users influences trip-making decisions, which eventually result in the following:

- Diverted trips from the Lynnway and Carroll Parkway to other roadways.
- Peak-hour spread, for example the two-hour (7:00 AM–9:00 AM) AM peak period may spread to a three-hour (6:30 AM–9:30 AM) peak period.
- Change in transportation mode, for example from automobile to commuter rail, ferry boat, bus, bicycle, and/or walking
- Reduced and efficient trips, where trips are planned and chained together.

#### 7.1.4 Advantages

Alternative 2 has the following advantages:

- Supports the renovation of the Lynnway and Carroll Parkway corridor to make it more pedestrian and bicyclist friendly.
- Fulfils the vision of connecting the Lynn downtown area and nearby neighborhoods to the waterfront, and would better support the mixed land uses that the City is proposing for the waterfront, such as recreational, residential and commercial developments and office parks.
- Consistent with MassDOT's Healthy Transportation Compact: the pedestrian amenities and separated bike lanes would attract more people to walk and bike to the waterfront. Separated bike lanes can appeal to a broad range of people, and in doing so would contribute to increases in bicycling volumes and rates by as much as 10-to-20 percent, compared to five-to-seven percent for traditional bike lanes.<sup>22,23</sup> In addition, providing separated bike lanes where they currently do not exist would reduce vehicle-bicycle crashes by approximately 60-to-74 percent.<sup>24</sup>
- Functions well and would not cause any significant delays to motorists: therefore, it would remake the Lynnway and Carroll Parkway into a pedestrian-oriented roadway while maintaining traffic flow.

#### 7.1.5 Disadvantages

Alternative 2 has the following disadvantages:

- Requires land takings at selected locations in order to widen the median.
- Construction would have an impact on traffic flow and affect commuters and business activities

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<sup>22</sup> New York City Department of Transportation, Prospect Park West: Bicycle Path and Traffic Calming Update, Retrieved from <http://www.nyc.gov/html/dot/downloads/pdf/> 2012\_ppw\_trb2012.pdf.

<sup>23</sup> Parks J., Ryus P., Tanaka A., Monsere C., McNeil M., Dill J., Schultheiss W., District Department of Transportation Bicycle Facility Evaluation, Project No. 11404, (2012). Retrieved from <http://ddot.dc.gov/node/477212>.

<sup>24</sup> Ibid.

### 7.1.6 Cost

Based on the reconstruction costs of similar past projects recorded in the MassDOT project information database, MPO staff estimate Alternative 2 to cost approximately between \$15-and-\$20 million, excluding any land takings required for the improvement. This estimate includes drainage improvements, sidewalk and ADA-compliant ramp construction, landscape and streetscape renovation, paving, traffic signals and equipment upgrade, and street lighting.

## 7.2 ALTERNATIVE 3: BOULEVARD STYLE ROADWAY

### 7.2.1 Roadway Setting

Alternative 3 would convert the Lynnway and Carroll Parkway into a boulevard-style roadway with a wider, planted median (20-to-30 feet wide), especially in the Lynnway segment. It would consist of two travel lanes and a separated bicycle lane in each direction (see Figure 29). The design includes wider sidewalks and new landscaping and streetscape design, including trees, bus shelters with benches, and ornamental lighting. Figure 30 gives examples from existing models of how Alternative 3 would look, such as North and South Common Streets in Lynn or a smaller-scale Commonwealth Avenue in Boston.

Alternative 3 promotes a renovation of the Lynnway and Carroll Parkway into a pedestrian- and bicycle-oriented boulevard while maintaining traffic flow. The wider median (compared to Alternative 2) would significantly soften the traffic-dominant environment that characterizes the Lynnway and attract more pedestrians and bicyclists to walk or bike to the waterfront. It would also make the daunting Lynnway far easier for pedestrians to cross. By transforming the Lynnway and Carroll Parkway into a boulevard, the roadway would become both a transportation corridor as well as a neighborhood amenity that supports livable communities and vibrant waterfront activities. With space for driving, walking, and bicycling, Alternative 3 would support multimodal connections to downtown Lynn, including the proposed Bike-to-the-Sea trail, the General Electric commuter rail station and transportation service centers such as Lynn Central Square Station and the Lynn Ferry terminal.

### 7.2.2 Operational Features

In addition to the landscape and streetscape and welcoming environment for pedestrians and bicyclists, providing the following operational features would increase safety and modernize the roadway to serve all users efficiently:

- Upgrade signal equipment to MassDOT standards, preferably to an adaptive traffic signal control system
- Retime and coordinate signals.
- Install protected-permitted left-turn treatments.

- Add accessible pedestrian signals.
- Install detection for bicycles.
- Add an Opticom system for handling emergency-vehicle preemption.
- Install transit signal priority to reduce bus service delays.
- Install advance street name signs to guide motorists.

### 7.2.3 Level of Service

With signal coordination, protected-permitted left-turn treatments, and concurrent pedestrian phases, the expected performance of Alternative 3 in terms of LOS and delay for the weekday AM and PM and Saturday PM peak hours would be similar to those of Alternative 2: operates satisfactorily (LOS D or better for the high-volume through traffic). In addition, the reduction in traffic capacity possibly would reduce traffic volumes on the Lynnway and Carroll Parkway through peak-hour spreading and contribute to changes in mode of transportation from automobile to transit.

### 7.2.4 Advantages

The following are the advantages of Alternative 3:

- Remakes the Lynnway and Carroll Parkway into a pedestrian- and bicyclist-friendly transportation corridor, as well as into a neighborhood amenity that supports livable communities and vibrant waterfront activities.
- Beautification of the roadway, reduction in travel lanes, and corridor-specific improvements such as a wider median, shorter crosswalks, and separated bike lanes can appeal to a broad range of people and together are expected to calm traffic (lower speeds and improve safety). Research has shown that such corridor-specific traffic calming improvements can reduce crashes by about 30 percent.<sup>25</sup>
- Fulfills the vision of connecting the Lynn downtown area and surrounding neighborhoods with a vibrant waterfront.
- Consistent with MassDOT's Healthy Transportation Compact: the pedestrian amenities and separated bike lanes would attract more people to walk and bike to the waterfront, thereby better supporting mixed the land uses that the city has proposed for the waterfront.
- Functions well and would not cause any significant delays to motorists, remaking the Lynnway and Carroll Parkway into a pedestrian-oriented roadway while maintaining traffic flow.

### 7.2.5 Disadvantages

The following are the disadvantages of Alternative 3:

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<sup>25</sup> Crash Modification Factors Clearinghouse, U.S. Department of Transportation, Federal Highway Administration, <http://www.cmfclearinghouse.org/index.cfm>.

- Requires more land takings to accommodate a wider median, as the median proposed would not fit into the existing right-of-way.
- Costs considerably more to build compared to Alternative 2.
- Construction would affect traffic flow and affect commuters and business activities, as the improvements in Alternative 3 necessitate a complete roadway reconstruction.
- Access to side streets would be affected, such as to Commercial Street.
- Intersections along the corridor would have to undergo major reconstructions in order to create the wider median, which would require a relocation of utilities and a possible negative impact to the commuter rail bridges located on the west side of the Lynnway.
- Extending the improvements to the Carroll Parkway and Nahant rotary would be difficult: the rotary may need to be reconstructed.

## 7.2.6 Cost

Based on the reconstruction costs of similar past projects archived in the MassDOT project information database, MPO staff estimate Alternative 3 to cost approximately \$25-to-\$30 million, excluding the land takings required for the improvements. This estimate includes drainage improvements, accommodation and relocation of utilities, sidewalk and ADA-compliant ramp construction, landscape and streetscape renovation, paving, traffic signals and equipment upgrade, and installation of street lighting.

## 7.3 ALTERNATIVE 4: ADDING PEDESTRIAN BRIDGES TO THE LYNNWAY

### 7.3.1 Roadway Setting

This alternative was added because pedestrian bridges were discussed during the advisory task force meetings. Pedestrian bridges over the Lynnway have been discussed in the community as a means to open West Lynn to the waterfront. Presently there is a pedestrian bridge over the Carroll Parkway connecting the North Shore Community College and the Lynn Heritage State Park. Two options were developed for Alternative 4.

#### *Option 1: Keep Existing Travel Lanes*

Alternative 4 would keep the existing roadway cross-section and add pedestrian bridges at selected locations for crossing the Lynnway to increase safety and mobility for pedestrians. Additional improvements include reducing lane widths to 10 feet from 11 feet in order to create a 13-foot curb lane in both directions for shared-use with bicyclists (Figure 31). MPO staff recommend pavement markings in the shared-use lanes (sharrows) to alert drivers to share the roadway and watch for bicyclists. New sidewalks with buffers, bus shelters with benches, and landscape and streetscape beautification are suggested in this alternative to

provide a welcoming experience for pedestrians and bicyclists. Figure 32 gives examples models for Alternative 4, such as Soldiers Field Road in Allston and Brighton, Storrow Drive in Boston, or extending the Carroll Parkway roadway character to the Lynnway portion of the corridor.

#### *Option 2: Reduce Travel Lanes*

Much like Alternative 2, Alternative 4 could also be reconfigured to reduce travel lanes to four lanes (two lanes in each direction) and add pedestrian bridges at selected locations for crossing the Lynnway and separated bicycle lanes in both directions.

### 7.3.2 Candidate Locations

In locating the pedestrian bridges, we must consider the land uses proposed for the waterfront and the desired connections amongst the Lynn downtown area, the waterfront's surrounding neighborhoods, and the pertinent transportation centers. Candidate locations include the busy Commercial Street intersection; the Harding Street intersection, which lacks a crosswalk on the Lynnway; and the Blossom Street intersection, which would provide access to the Lynn Ferry terminal. These three options are discussed below.

- The Blossom Street and Lynnway intersection is a candidate location. It provides access to the Lynn Ferry Terminal, Lynn Commons and the surrounding neighborhoods. Presently, a raised median at the intersection prevents direct access to the ferry terminal, resulting in inefficient traffic circulation for thousands of commuters. In addition, the intersection lacks a crosswalk on the Lynnway, which puts pedestrians and bicyclists at risk.
- The Commercial Street and Lynnway intersection would be a good location for a pedestrian bridge. It is a busy intersection with high volumes of traffic that conflict with pedestrian and bicycle movements. The intersection has one of the longest crosswalks across the Lynnway and it is intimidating to many pedestrians and bicyclists. Another supporting factor is that Commercial Street connects directly with the waterfront, Lynn Commons, and the neighborhoods.
- The Harding Street and Lynnway intersection is a potential location for a pedestrian bridge. Presently, it has no crosswalk on the Lynnway. Harding Street, although it presently carries very little traffic, could be extended to the west in the future in order to connect to the proposed General Electric commuter rail station, thereby becoming an access road for waterfront residents and visitors to the commuter rail station. Because it has direct access to the waterfront, a pedestrian bridge at this location could make it easier to walk or bike to the waterfront or commuter rail station.

### 7.3.3 Operational Features

In addition to the pedestrian bridges and bicycle lanes, incorporating the following operational features into Alternative 4 would help to modernize the Lynnway and Carroll Parkway, increase safety, and make traffic flow efficiently:

- Upgrade signal equipment to MassDOT standards.
- Retime and coordinate signals.
- Add accessible pedestrian signals.
- Install detection for bicycles.
- Add an Opticom system for handling emergency-vehicle preemption.
- Installing transit signal priority to reduce bus service delays.
- Install advance street name signs to guide motorists.

### 7.3.4 Level of Service

#### *Option 1: Keep Existing Travel Lanes*

Figures 33 through 35 show the resulting performance of Alternative 4, Option 1, in terms of LOS and delays for the weekday AM and PM and Saturday PM peak hours. The analyses show that with signal coordination, protected left-turn treatments, and concurrent pedestrian phases, Alternative 4 would operate satisfactorily (LOS D or better for the high volume of through traffic).

#### *Option 2: Reduce Travel Lanes*

With signal coordination, protected-permitted left-turn treatments, and concurrent pedestrian phases, the expected performance of Alternative 4, Option 2, in terms of LOS and delay for the would be similar to those of Alternative 2: operates satisfactorily (LOS D of better for the high-volume through traffic). The reduction in traffic capacity could reduce traffic volumes on the Lynnway and Carroll Parkway through peak-hour spreading and encourage changes in mode of transportation from automobile to transit.

### 7.3.5 Advantages

The following are the advantages of Alternative 4:

- Fulfils the vision of connecting the Lynn downtown area, neighborhoods to the Waterfront, and would better support mixed land uses that the City is proposing for the Waterfront such as recreational, residential and commercial developments, and office parks.
- Supports transformation of the Lynnway and Carroll Parkway corridor to make it more pedestrian and bicyclist friendly
- Serve all users safely and efficiently. Pedestrian bridges would make it easier to cross the Lynnway and connect Waterfront development to Lynn downtown and neighborhoods, Lynn Ferry terminal, and the proposed General Electric commuter rail station.

- Functions well by making traffic flow efficient, as it provides more green time to serve vehicular traffic.
- Fits into the existing right-of-way and would require minor land takings—only at locations where the pedestrian bridges would be constructed.

### 7.3.6 Disadvantages

The following are the disadvantages of Alternative 4:

- MassDOT standards require pedestrian bridges to comply with current ADA standards. Fulfilling this ADA requirement would result in very long (or complex, winding) ramps and very large bridge footprints that may not follow pedestrian desire lines, and may also require real estate takings to accommodate this infrastructure.
- Pedestrian bridges work very well when the roadway is depressed so the pedestrian bridge is at grade level (no ramps) and seems more convenient than descending to road level.
- Because of their expense, pedestrians bridges are usually far apart and most pedestrians will not voluntarily accept the added inconvenience of walking five or ten minutes out of their way simply to use a bridge, and instead will cross at grade at the nearest convenient location. This can have the effect of actually reducing pedestrian safety, as drivers will not expect at-grade crossings if pedestrian bridges are present. An easier solution to this problem would be to erect fences and barriers to force pedestrians to use the bridge.
- Erecting fences might improve safety by forcing pedestrians and bicyclists to use pedestrian bridges, but generally, it reduces mobility and connectivity and results in a loss of pedestrian access. The addition of fencing to the roadway would reduce access for all motorists and bicyclists, in addition to pedestrians, and may not be feasible with the number of curb cuts present.

### 7.3.7 Cost

Based on the reconstruction costs of similar past projects archived in the MassDOT project information database, MPO staff estimate Alternative 4 to cost approximately \$20-to-\$25 million, excluding the cost of the land takings required for the improvements. This estimate includes two ADA-compliant pedestrian bridges, drainage improvements, accommodation and relocation of utilities, sidewalk and ADA-compliant ramps, landscape and streetscape renovation, paving, traffic signals and equipment upgrade, and the installation of street lighting.

## 7.4 ALTERNATIVE 5: ALTERED TRAFFIC CIRCULATION PATTERN

### 7.4.1 Roadway Setting

Alternative 5 was suggested in the Lynn Waterfront Master Plan prepared by Sasaki Associates.<sup>26</sup> This alternative is comparable to Alternative 2 except that the traffic circulation pattern is altered on the Lynnway and Carroll Parkway close to the downtown area and North Shore Community College area, as shown in Figure 36. The high volume of traffic on the Lynnway and the split between the Carroll Parkway and Route 1A creates a traffic queue from the Market Street and Broad Street intersection toward the Lynnway. This alternative eliminates the problem by splitting the traffic going between the Lynnway and Lynn Shore Drive, with northbound traffic staying on the water side of North Shore Community College and southbound traffic shifting to the land side, via Washington Street and Broad Street. Another purpose of this alternative is that splitting the roadway into one-way traffic circulation would make it easier for pedestrians to cross the roadway to the waterfront. MPO staff analyzed this alternative in order to provide more information for stakeholders' decision making. As with the other alternatives, the design would include new sidewalks, landscape and streetscape renovation with trees and plants, and bus shelters with benches to provide a welcoming experience for motorists, pedestrians, and bicyclists. Examples for Alternative 5 from existing roadways are similar to those of Alternative 2: Veterans of Foreign War (VFW) Parkway in West Roxbury and Blue Hills Parkway in Milton, both of which are shown in Figure 25.

### 7.4.2 Operational Features

The following operational features should be incorporated into Alternative 5 to increase safety and modernize roadway efficiency:

- Upgrade signal equipment to MassDOT standards, preferably to an adaptive traffic signal control system.
- Retime and coordinate signals.
- Install a protected-permitted left-turn treatment.
- Add accessible pedestrian signals.
- Install detection for bicycles.
- Add an Opticom system for handling emergency-vehicle preemption.
- Install transit signal priority to reduce bus service delays.
- Install advance street name signs to guide motorists.

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<sup>26</sup> Sasaki Associates, Inc., in collaboration with ZHA and GEI, Lynn Waterfront Master Plan Report, prepared for the City of Lynn, September 2007.

### 7.4.3 Level of Service

Figures 37 through 39 show the performance of Alternative 5 in terms of LOS and delay for the weekday AM and PM and Saturday PM peak hours. The analyses indicate that this alternative would increase traffic congestion in the downtown area because of the high-volume AM peak-period traffic that would be rerouted to Washington Street and Broad Street. Appendix L includes the LOS worksheets for this alternative.

### 7.4.4 Advantages

The following are the advantages of Alternative 5:

- Transforms the Lynnway and Carroll Parkway corridor to make it more pedestrian and bicyclist friendly.
- Fulfills the vision of connecting the Lynn downtown area and surrounding neighborhoods to the Waterfront, and would better support the mixed land uses that the city is proposing for the waterfront, such as recreational, residential and commercial developments, and office parks.
- Benefits pedestrian and bicycle traffic because the one-way traffic circulation makes it easier for them to cross the Carroll Parkway.
- Consistent with MassDOT's Healthy Transportation Compact: the pedestrian amenities and separated bike lanes would attract more people to walk and bike to the waterfront.

### 7.4.5 Disadvantages

The following are the disadvantages of Alternative 5:

- Requires widening Broad Street/Route 1A and Washington Street to accommodate the high volume of traffic that would be shifted to these roads.
- Increases congestion and traffic queues on Broad Street and Market Street, which may have an impact on traffic circulation in the downtown area.
- Results in inefficient traffic flow, which could affect emergency-response services.
- Increases U-turn volume at the Nahant Rotary: traffic going to the North Shore Community College would need to go through the rotary to access Washington Street, which would exacerbate problems at the rotary, especially during the weekday PM peak period when traffic volumes through the rotary are high.

### 7.4.6 Cost

Based on the reconstruction costs of similar past projects archived in the MassDOT project information database, MPO staff estimate Alternative 5 to cost

approximately \$15-to-\$20 million, excluding the land takings required for the improvements. This estimate includes roadway reconstruction, drainage improvements, the accommodation and relocation of utilities, sidewalk- and ADA-compliant ramp construction, landscape and streetscape renovation, paving, traffic signals and equipment upgrade, and the installation street lighting.

## 7.5 ALTERNATIVE 6: BUS RAPID TRANSIT (BRT) LANES

### 7.5.1 Roadway Setting

There are six bus routes on the Lynnway serving Lynn and the surrounding communities, with total average daily ridership of 6,000 passengers or more. The service connects passengers to transportation centers such as Lynn's Central Square, Wonderland Station, and Downtown Boston. The bus service meets on-time performance or schedule adherence only 50 percent of the time because of traffic congestion and interruptions. Median-oriented BRT lanes would improve bus service performance, as such lanes effectively avoid the interruptions caused by traffic access, egress from business driveways or right turn onto side streets. Exclusive bus lanes and a transit signal priority for BRT systems would reduce traffic delays and improve on-time performance.

Alternative 6 keeps the existing roadway cross-section and converts the lanes close to the median into median-oriented BRT lanes (see Figure 40). The alternative would provide two lanes in each direction of the Lynnway and Carroll Parkway for general-purpose traffic and left-turn lanes at selected locations for the traffic accessing driveways and side streets. Additional improvements include widened curb lanes (about 14 feet) for shared use with bicycles or widened shoulders (about 4 feet) for use by bicyclists. Figure 41 shows examples of roadways with BRT facilities.

### 7.5.2 Operational Features

Additional improvements included in Alternative 6 to increase safety and modernize the roadway's efficiency are:

- Upgrade signal equipment to MassDOT standards, preferably to an adaptive traffic signal control system.
- Install transit signal priority to reduce bus service delay.
- Install an Opticom system for handling emergency-vehicle preemption.
- Add accessible pedestrian signals.
- Install detection for bicycles.
- Install advance street name signs to guide motorists.

### 7.5.3 Level of Service

The performance of Alternative 6 in terms of LOS and delay for the weekday AM and PM and Saturday PM peak hours would be similar to Alternative 2: operates satisfactorily at LOS D or better for the high volume of through traffic.

### 7.5.4 Advantages

The following are some of the benefits of Alternative 6:

- Minimizes the traffic conflicts that come from vehicles parking, turning, and entering the arterial, thereby improving safety, reliability, and the on-time performance of the local bus service, and increasing bus ridership.
- Fulfills the vision of connecting the Lynn downtown area and surrounding neighborhoods to a vibrant waterfront. Provides improved connectivity amongst the waterfront, Lynn's downtown area and Wonderland Station through frequent and reliable bus service. Although the Lynnway represents a small portion of the routes for which the local bus services are responsible, future development along the corridor would benefit from the BRT connecting with Lynn's downtown area and Wonderland.
- Consistent with MassDOT's Healthy Transportation Compact: the pedestrian amenities and separated bike lanes would attract more people to walk and bike to the waterfront, thereby better supporting the mixed land uses that the city has proposed for the waterfront.
- BRT systems generally include rapid transit features like more frequent service than local bus service provides, which results in ridership increase and supportive land development.
- Pedestrian- and bicyclist-friendly: a median space makes it safer for pedestrians and bicyclists crossing the Lynnway and minimizes traffic interference. In addition, one platform with shelter and benches can potentially serve both directions of travel.
- Functions well and would not cause any significant delays to motorists; hence, it would remake the Lynnway and Carroll Parkway into a pedestrian-oriented roadway while maintaining traffic flow.

### 7.5.5 Disadvantages

- Alternative 6 would not fit into the existing right-of-way and may require additional space to widen the median in areas where it is less than 12-feet wide in order to accommodate stops and amenities such as bus shelters.
- Requires special MBTA buses with doors on the left side to allow passengers to board and alight from a space in the median.

### 7.5.6 Cost

Based on the reconstruction costs of similar past projects archived in the MassDOT project information database, MPO staff estimate Alternative 6 to cost approximately \$25-to-\$30 million, excluding the cost of any land takings or new buses. This estimate includes drainage improvements, the accommodation and relocation of utilities, sidewalk and ADA-compliant ramp construction, bus shelters and benches, landscape and streetscape renovation, paving, new traffic and transit priority signals, equipment upgrade, and installation of street lighting.

## 7.6 ALTERNATIVE ANALYSIS

### 7.6.1 Performance Measures

Table 5 presents the peak-hour arterial performance measures for each alternative. The arterial performance measure contains information about the LOS and speeds for the principal arterial streets: Lynnway and Carroll Parkway. The analyses indicate that for each alternative, the arterial streets would operate at LOS D or better. Table 6 presents the peak-hour network performance measures for the alternatives. The network performance measures contain information about total delay, average travel speed, and total travel time for the street network, including the side streets. The analyses indicate higher delays for Alternative 5 compared to the remainder of the alternatives.

**TABLE 5**  
**Arterial Performance Measures**

--	--	Speed	LOS												
--	--	NB	NB	NB	NB	NB	NB	SB	SB	SB	SB	SB	SB	SB	SB
Alternative	Year	AM	AM	PM	PM	SAT	SAT	AM	AM	PM	PM	SAT	SAT	SAT	SAT
Existing Conditions	2015	24.4	B	22.5	C	19.8	C	21.9	C	21.6	C	22.1	C		
Alternative 1	2015	24.5	B	22.8	C	24.2	B	25.7	B	23.9	C	24.5	B		
Alternative 1	2040	23.3	C	22.1	C	22.7	C	24.2	B	23.2	C	20.6	C		
Alternatives 2, 3, and 6	2040	23.3	C	16.9	D	21.6	C	19.3	C	20.4	C	19.3	C		
Alternative 4	2040	23.3	C	22.1	C	22.7	C	24.2	B	23.2	C	20.6	C		
Alternative 5	2040	23.1	C	16.4	D	22.9	C	15.5	D	21.3	C	20.6	C		

AM = ante meridiem (before noon). LOS = level-of-service rating. NB = northbound. PM = post meridiem (after noon). SAT = Saturday. SB = Southbound.

Source: Central Transportation Planning Staff.

**TABLE 6**  
**Network Performance Measures**

--	--	Total Delay (hr)	Total Delay (hr)	Total Delay (hr)	Average Speed (mph)	Average Speed (mph)	Average Speed (mph)	Total Travel Time (hr)	Total Travel Time (hr)	Total Travel Time (hr)
Alternative	Year	AM	PM	SAT	AM	PM	SAT	AM	PM	SAT
Existing Conditions	2015	117	134	148	22	22	20	312	350	349
Alternative 1	2015	97	118	113	23	23	22	293	335	314
Alternative 1	2040	104	124	124	23	22	22	307	344	331
Alternatives 2, 3, and 6	2040	128	198	143	21	19	21	327	431	348
Alternative 4	2040	104	124	124	23	22	22	307	344	331
Alternative 5	2040	226	223	146	17	18	21	445	462	366

AM = ante meridiem (before noon). PM = post meridiem (after noon). SAT = Saturday.

Source: Central Transportation Planning Staff.

Table 7 summarizes how each of the alternatives accomplishes the goals and objectives of the study. The evaluation criteria are intended to provide qualitative and quantitative measures of the alternatives, providing insight into how the alternatives compare or relate to one another. The goals and objectives are:

- Supports Lynn's vision for the waterfront.
- Promotes healthy transportation.
- Increases safety for all road users.
- Makes traffic flow efficiently (reduce congestion).
- Creates a pedestrian- and bicyclist- friendly roadway.
- Makes transit service more efficient.
- Promotes land use and economic and cultural activities.

**TABLE 7**  
**Summary of Alternatives Analyses**

Goals and Objectives	Alternative 1	Alternative 2	Alternative 3	Alternative 4	Alternative 5	Alternative 6
Supports Lynn's vision for the waterfront	No benefit	Significant benefit	Significant benefit	Significant benefit	Significant benefit	Significant benefit
Promotes healthy transportation	No benefit	Significant benefit	Significant benefit	Significant benefit	Significant benefit	Significant benefit
Increases safety for all road users	Moderate benefit	Significant benefit				
Makes traffic flow efficiently	Moderate benefit	Moderate benefit	Moderate benefit	Significant benefit	No benefit	Moderate benefit
Promotes multimodal transportation	Moderate benefit	Significant benefit	Significant benefit	Moderate benefit	Significant benefit	Significant benefit

<b>Goals and Objectives</b>	<b>Alternative 1</b>	<b>Alternative 2</b>	<b>Alternative 3</b>	<b>Alternative 4</b>	<b>Alternative 5</b>	<b>Alternative 6</b>
Makes transit service more efficient	No benefit	Moderate benefit	Moderate benefit	Moderate benefit	Moderate benefit	Significant benefit
Promotes land use and economic and cultural activities	No benefit	Significant benefit	Significant benefit	Moderate benefit	Significant benefit	Significant benefit
Potential property impacts	None	Moderate	Significant	Moderate	Moderate	Significant
Associated construct cost*	Low	Moderate	High	Moderate	Moderate	High

\*Associated construction costs for those alternatives, which require an expansion of the right-of-way, as land takings will add to the total cost but are not accounted for in the study.

Source: Central Transportation Planning Staff.

## 7.6.2 Selecting Preferred Alternatives

The primary factors for selecting the preferred long-term alternatives are cost and effectiveness in meeting the goals and objectives described above. The one short-term alternative we have offered would not support many of the study's goals and objectives, but it addresses immediate safety and operations concerns, such ADA concerns, safety for pedestrians, traffic operations issues, and access to the Lynn ferry terminal.

Generally, all of the long-term alternatives meet the goals and objectives of the study, which, overall, aim to support Lynn's vision for the waterfront development. With improved local street connectivity, the long-term alternatives would facilitate linkage between the waterfront and Lynn's downtown area and surrounding neighborhoods. In addition, they are expected to improve safety for all users and promote healthy transportation modes: the proposed sidewalks with buffers, separated bicycle lanes, pedestrian bridges, and median refuge areas for pedestrians would not only increase safety for users but also create a pedestrian- and bicyclist-friendly roadway and encourage walking and bicycling.

Furthermore, the traffic analyses indicate that the long-term alternatives would function well while not contributing significantly to traffic congestion (except for Alternative 5 in the downtown area), and would balance regional traffic needs with pedestrian and bicycle needs and support vibrant waterfront economic activities. Again, with improved local street connectivity, all of the alternatives would allow direct and safe public access to the Lynn ferry terminal, the proposed GE commuter rail station, and Lynn Central Square Station. However, Alternative 6 provides the most effective improvements to bus transit service in the corridor to support the economic activities of the waterfront.

# Chapter 8—Public Access and Connectivity

## 8.1 OVERVIEW

An essential step to fully implementing the city's vision for the waterfront is to improve the connectivity from the Lynnway and Carroll Parkway to foster the cohesion of the abutting land uses, connect people to places, and promote economic activities. Among the activity locations where direct public access from the Lynnway and Carroll Parkway would promote connectivity are:

- Waterfront development.
- Lynn's downtown and surrounding neighborhoods.
- North Shore Community College.
- Transportation Centers: Lynn ferry terminal, Lynn commuter rail station, Central Square bus terminal, and General Electric commuter rail station.
- The proposed Bike-to-the-Sea trail.

## 8.2 CONNECTIVITY POTENTIAL FOR MINOR STREETS

Several minor arterials and collector roadways that intersect the Lynnway have the ability to facilitate public access and connectivity from the waterfront to Lynn's downtown area, surrounding neighborhoods, and transportation centers.

However, they would need improvements in order to meet Complete Streets standards and support multimodal transportation. Figure 42 shows the land uses surrounding the Lynnway and Carroll Parkway and the streets with potential to facilitate connectivity among the land uses. Figure 43 shows the roadway characteristics of those streets. The following are brief descriptions of the problems at each location and the improvements needed to make those streets capable of supporting connectivity among the different land uses in the study area.

### 8.2.1 Harding Street

Although it presently carries very little traffic, Harding Street is a potential access road for waterfront residents and visitors to the proposed General Electric commuter rail station. It would need an extension and reconstruction to provide a welcoming experience for pedestrian and bicyclists, such as the inclusion of sidewalks, high-visibility crosswalks, street lighting, and bicycle lanes. MPO staff noted in Alternative 4 that the intersection of Harding Street and the Lynnway is a potential candidate for a pedestrian bridge, which would make it easier to walk or bike to the waterfront or commuter rail station from the other side of the corridor.

### 8.2.2 Oakville Street

MPO staff recommend extending Oakville Street to connect to the Lynnway and the waterfront. The extension would benefit the surrounding neighborhood and waterfront residents and visitors because Oakville Street connects to Western Avenue (Route 107) via Summer Street. Although the extension would require new roadway construction, a bridge over the MBTA Newburyport/Rockport commuter rail line, and a new intersection on the Lynnway, it is expected to reduce the high volume of traffic on Commercial Street and prevent future widening of that roadway. While the extension would require land takings to construct, it presents an opportunity to modernize Oakville Street to accommodate pedestrians and bicyclists with good a sidewalk experience and bike lanes or shared-use lanes to connect to the waterfront.

### 8.2.3 Commercial Street

This is one of the busiest streets connecting with the Lynnway and provides access to the waterfront, Lynn Common and the surrounding neighborhood, and Western Avenue via Summer Street. The intersection of Commercial Street and the Lynnway is busy, with high volumes of traffic that conflict with pedestrian and bicycle movements. The intersection has long crosswalks, which intimidate many pedestrians and bicyclists. Commercial Street needs improvements to provide a welcoming environment for pedestrians and bicyclists, such as good sidewalks and shoulders, or sharrows or bike lanes. In addition, the intersection of Commercial Street and the Lynnway is a potential candidate for a pedestrian bridge; it would make it easier to walk or bike to the waterfront or the surrounding neighborhoods by separating pedestrian and vehicular traffic at the intersection.

### 8.2.4 Blossom Street

Blossom Street provides access to the Waterfront, the Lynn ferry terminal, Lynn Common and surrounding neighborhood and Lynn's downtown. Opening the raised median and signalizing the intersection to provide safe turns would provide direct access to the ferry terminal for thousands of commuters and for waterfront residents and visitors. Besides the improvements needed at its intersection with the Lynnway to make it easier for pedestrians and bicyclists to cross the streets, Blossom Street also needs improvements along the segment to balance traffic needs with pedestrian and bicycle needs, including sidewalk repairs, shoulders or shared-use lanes or bike lanes, street lights, high-visibility crosswalks, and signage.

### 8.2.5 Pleasant Street

Pleasant Street connects to the Lynnway and provides access to the Lynn Common and surrounding neighborhood. St Mary's Parish and High School,

Shaw's Supermarket, and many small retail stores and offices are located on Pleasant Street. Pleasant Street has sidewalks on both sides of the street but would need improvements to give pedestrians a welcome experience and to better accommodate bicyclists, such as high-visibility crosswalks and shared-use lanes.

### 8.2.6 Market Street

Market Street is the main entry to Lynn's downtown area and North Shore Community College and in the future could connect to a vibrant waterfront. Market Street is about one half-mile long and is configured to serve downtown businesses and activities: it has two travel lanes in each direction, sidewalks and on-street parking on both sides of the street, and six signalized intersections. Market Street lacks gateway status and is not bicycle-friendly. In order to become a gateway to the city, it would need reconstruction to beautify it, with median landscape and streetscape treatments, and multimodal renovations to help it balance vehicular needs with pedestrian and bicyclist needs and link it to the waterfront development, North Shore Community College, and the Lynn Heritage State Park, thereby providing cohesion amongst the land uses.

### 8.2.7 Washington Street

Washington Street connects to the North Shore Community College, Sagamore Hill neighborhood, and Lynn's downtown area. It is a two-lane, two-way roadway, with a much lower volume of traffic compared to Market Street. It has sidewalks and on-street parking on both sides. Much like Market Street, the Washington Street corridor lacks gateway status and does not provide a comfortable experience for pedestrians and bicyclists. In 2008, the city developed a masterplan for the corridor.<sup>27</sup> Similar to that of the waterfront development, the city envisions the development of a mix of land uses, including retail, residential, and office spaces, in order to create vitality, increase real estate investment, and maximize development in the corridor. To implement this vision, as well as the vision for the waterfront, this corridor would need access and beautification improvements to create a friendly environment for pedestrians and bicyclists and promote connections between Sagamore Hill, North Shore Community College, Lynn's downtown area, and the waterfront.

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<sup>27</sup> Washington Street Gateway District Plan, Sasaki Associates, Inc., April 2008.

# Chapter 9—Conclusion and Next Steps

## 9.1 CONCLUSIONS

This study identified the transportation needs of the Lynnway and Carroll Parkway, which include safety, operations, and mobility. MPO staff, working with the study's advisory task force, has developed short- and long-term alternatives that would transform the Lynnway and Carroll Parkway into a pedestrian- and bicyclist-friendly roadway as well as into a transportation corridor that serves all modes of transportation and maintains regional travel capacity. MPO staff evaluated different roadway cross-sections to accommodate all road users safely and fulfill Lynn's vision for the waterfront, including improved connectivity from the Lynnway and Carroll Parkway to Lynn's downtown area, surrounding neighborhoods and the waterfront itself, thereby fostering cohesion among the abutting land uses, connecting people and their destinations, and promoting economic activity.

## 9.2 NEXT STEPS

This study provides the City of Lynn, DCR, MassDOT, and other stakeholders with an opportunity to begin researching the needs of the Lynnway and Carroll Parkway in light of the city's vision for the waterfront, and to start planning their design and engineering efforts. The next step is to select alternatives that are sensitive to the goals and needs of stakeholders and then advance them through the planning process. DCR currently owns both the Lynnway and Carroll Parkway and is responsible for implementing any short- and long-term recommendations. The City of Lynn owns the minor arterials and the local collectors that connect to the Lynnway and Carroll Parkway and is responsible for renovating those streets to enhance their connectivity. Therefore, it is important for the City of Lynn and DCR to examine the design of the long-term alternatives with everyone involved in mind: participation in this process by other stakeholders is important as well.

This study aligns with the MPO goals of modernizing roadways to reduce congestion, increasing safety on the region's highway system, expanding the quantity and quality of walking and bicycling, and making transit service more efficient and modern. It also addresses Lynn's goal of making the Lynnway and Carroll Parkway a more bicycle- and pedestrian-friendly roadway, conforming to its vision for the waterfront and for the cohesion of the abutting land uses. Any of the long-term alternatives this report offers, if implemented, would increase traffic safety, make traffic operations more efficient, and modernize the roadway to accommodate all users.

Transportation decision making is complex, and is influenced by factors such as financial limitations and agency programmatic commitments. Project development is the process that takes a transportation improvement from concept to construction. Appendix M includes an overview of the project development process.

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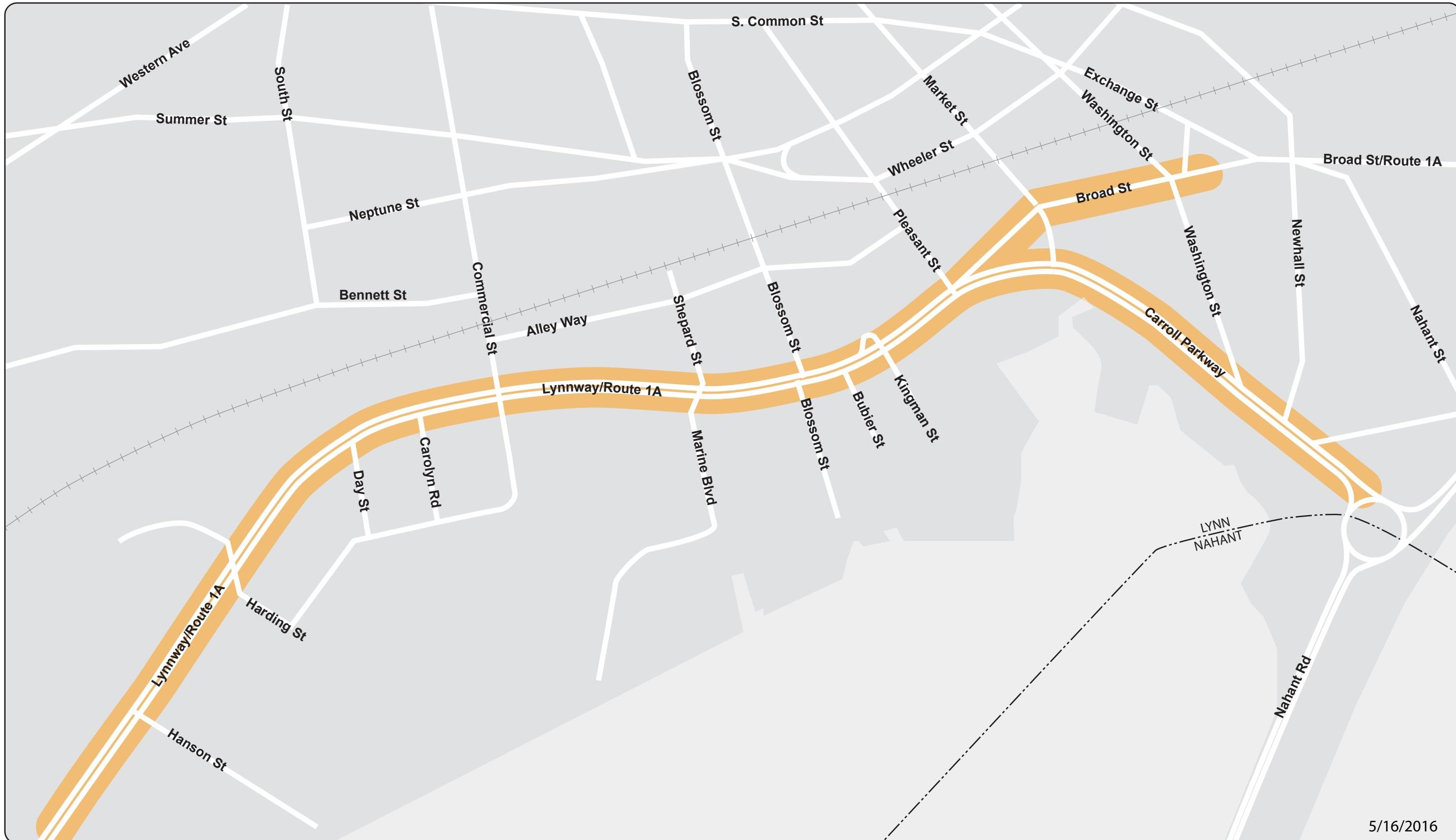
FIGURE 1  
Regional Map

Route 1A/Lynnway/Carroll Parkway  
Priority Corridor Study in Lynn



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**FIGURE 2**  
**Map of Existing and Proposed Land Use**

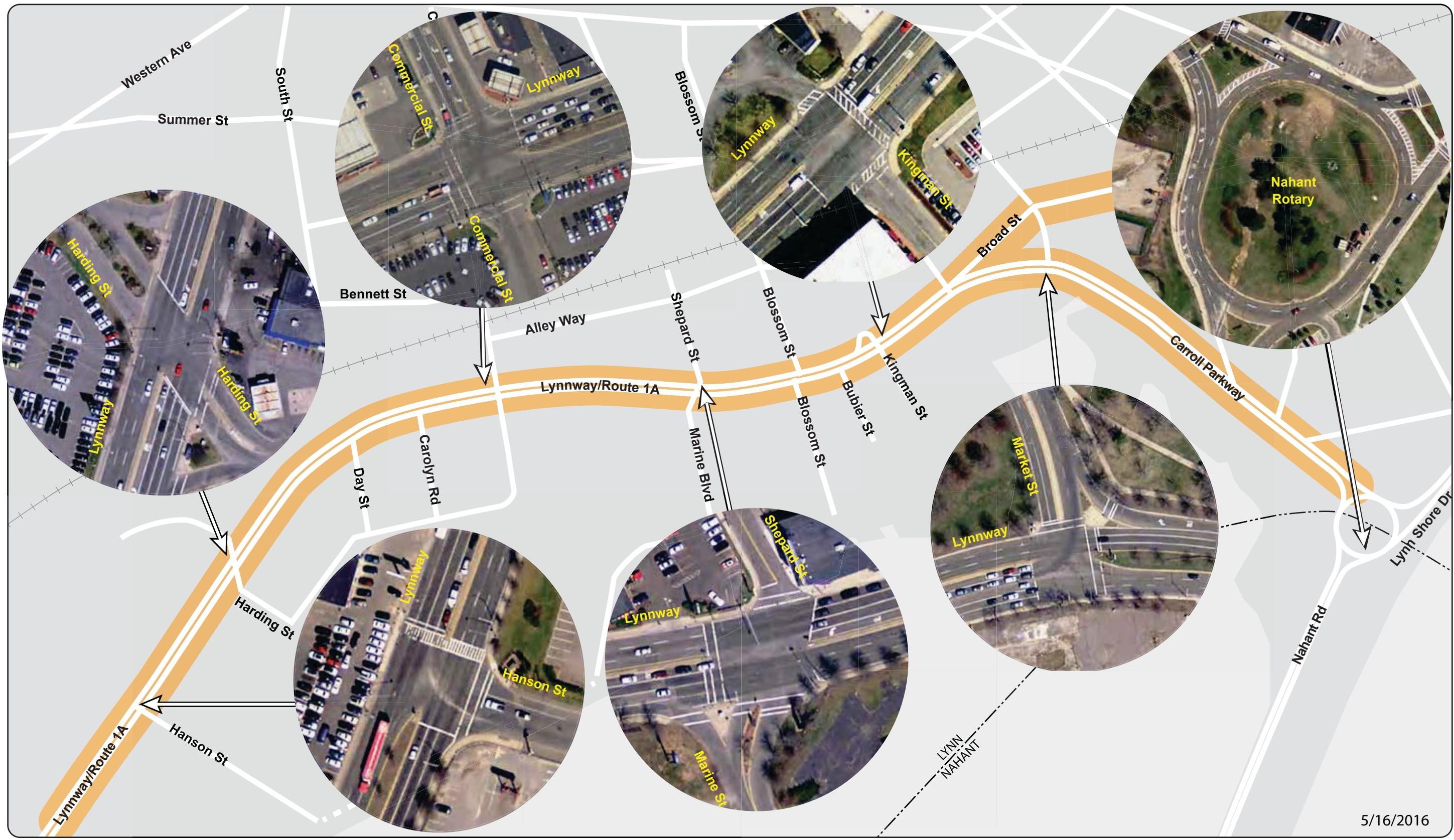


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**FIGURE 3**  
Study Area

Route 1A/Lynnway/Carroll Parkway  
Priority Corridor Study in Lynn



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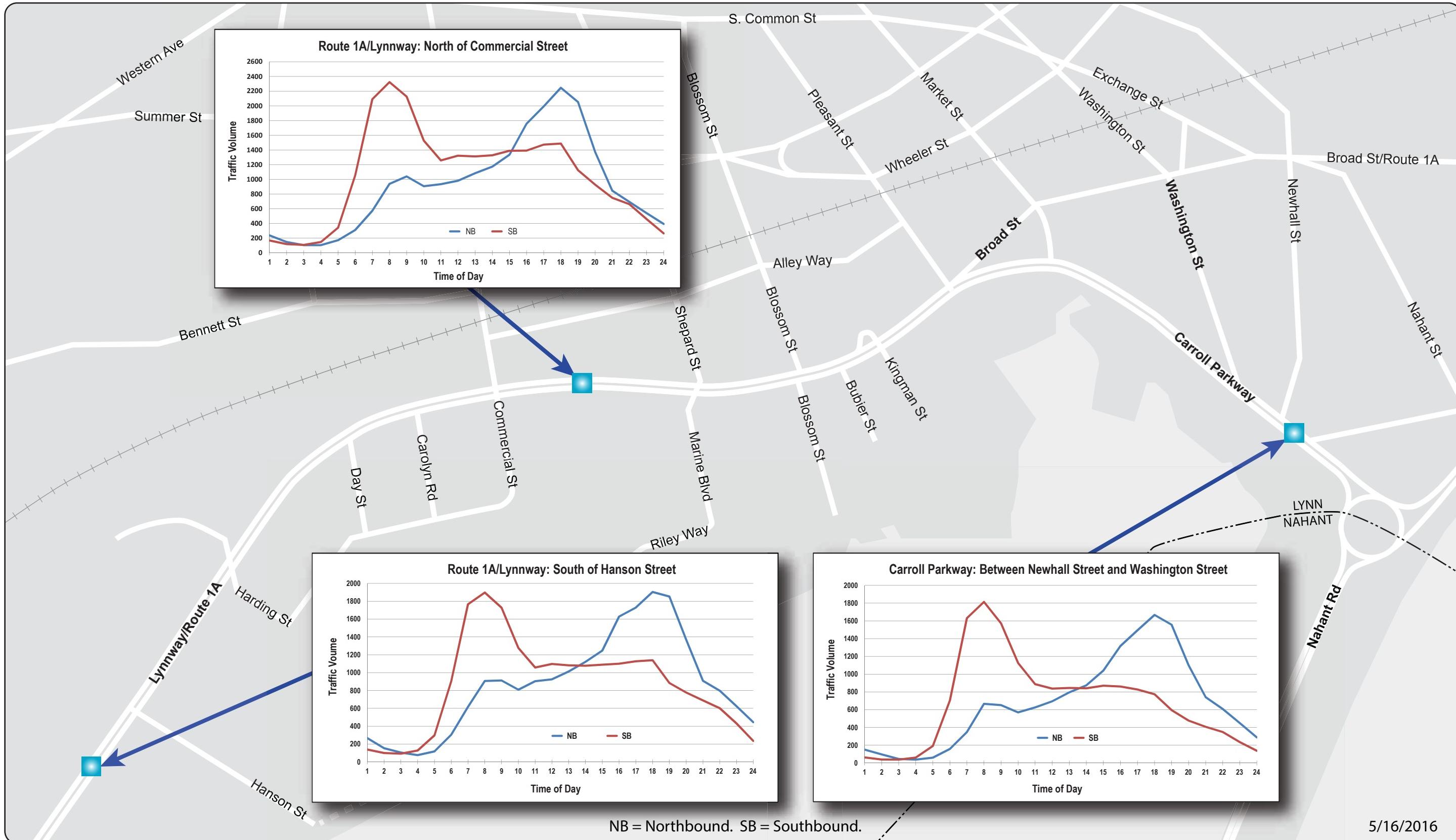


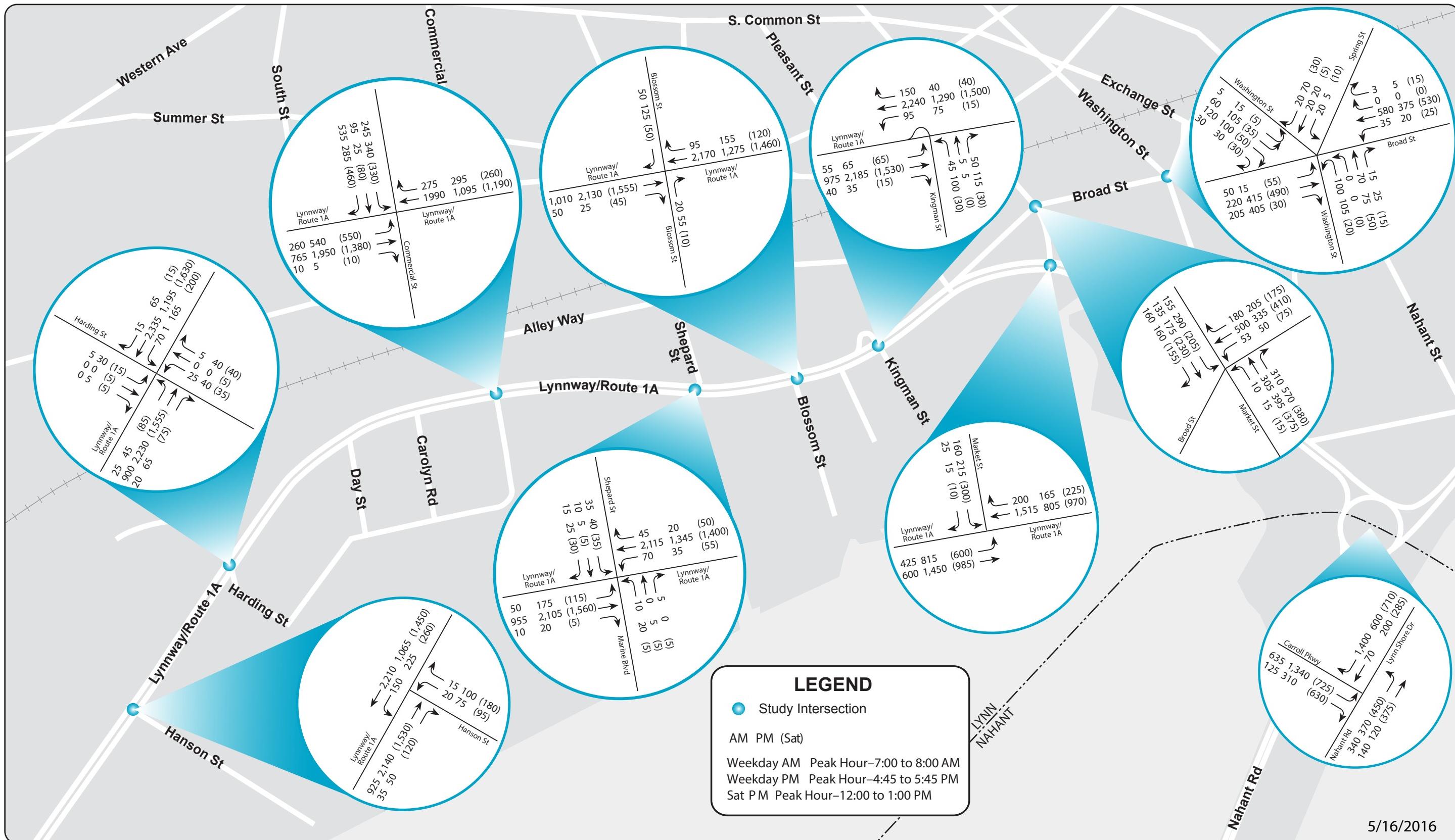
## **FIGURE 4**

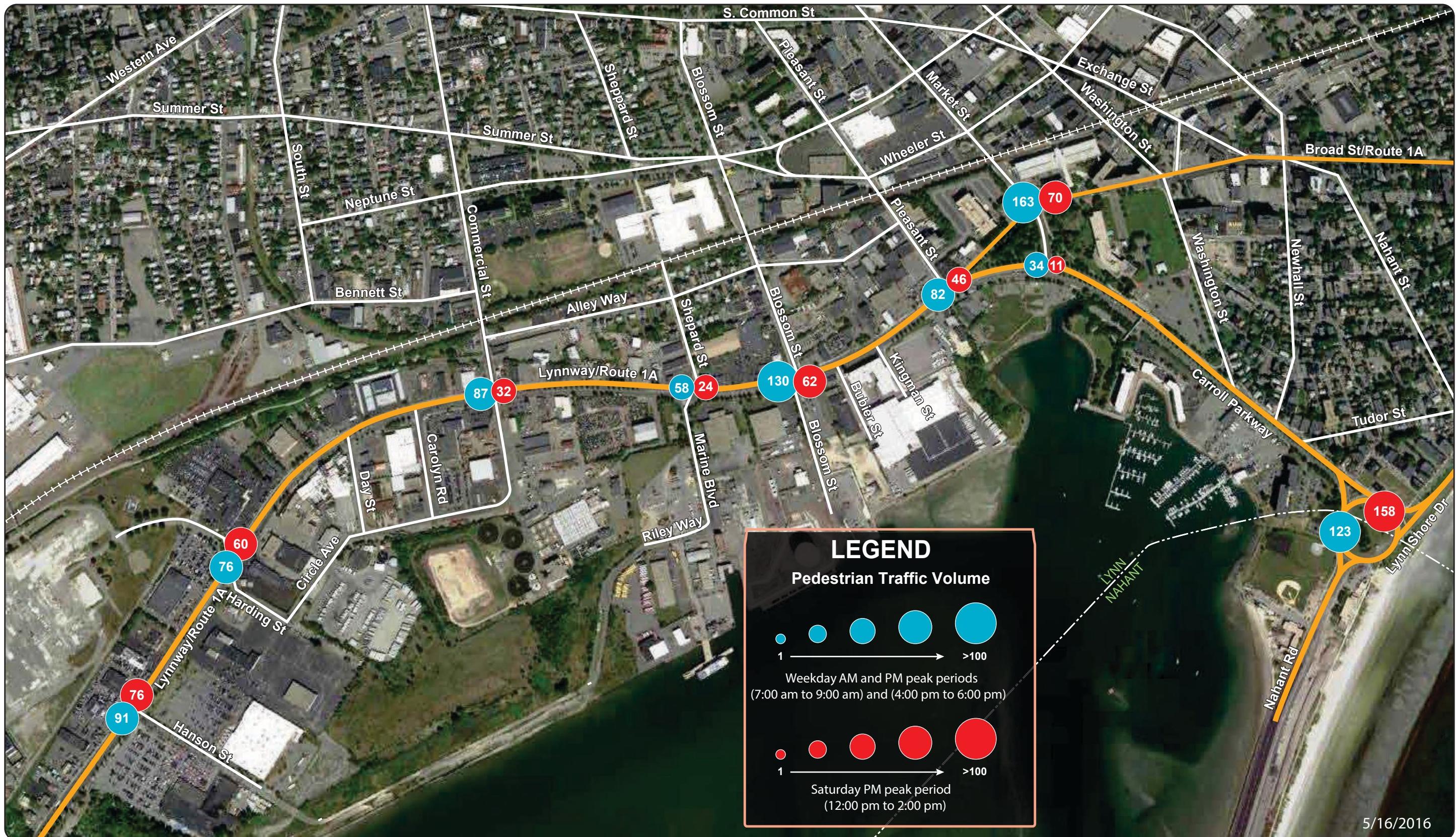
### **Study Area Intersections**

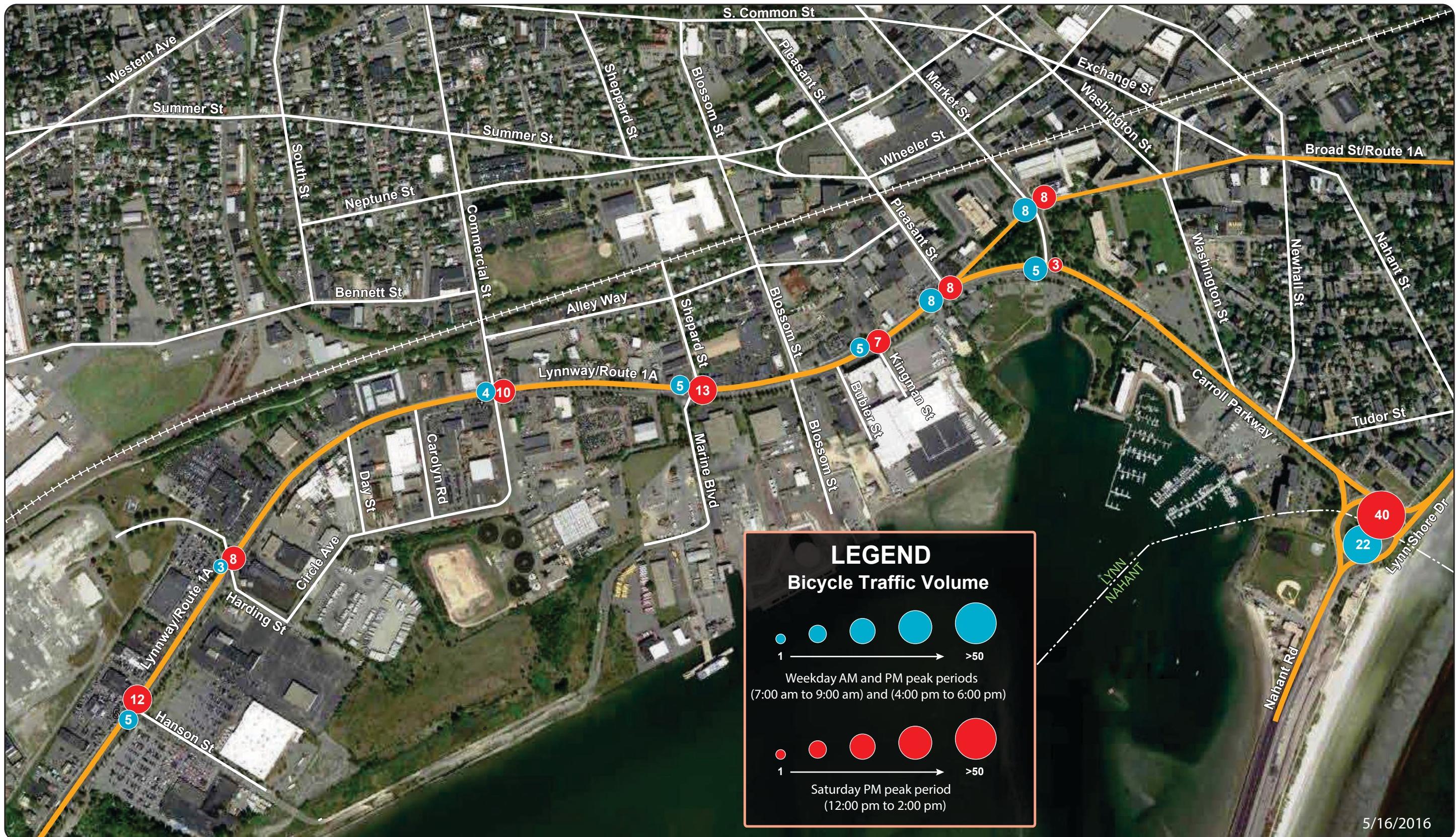
## *Route 1A/Lynnway/Carroll Parkway Priority Corridor Study in Lynn*







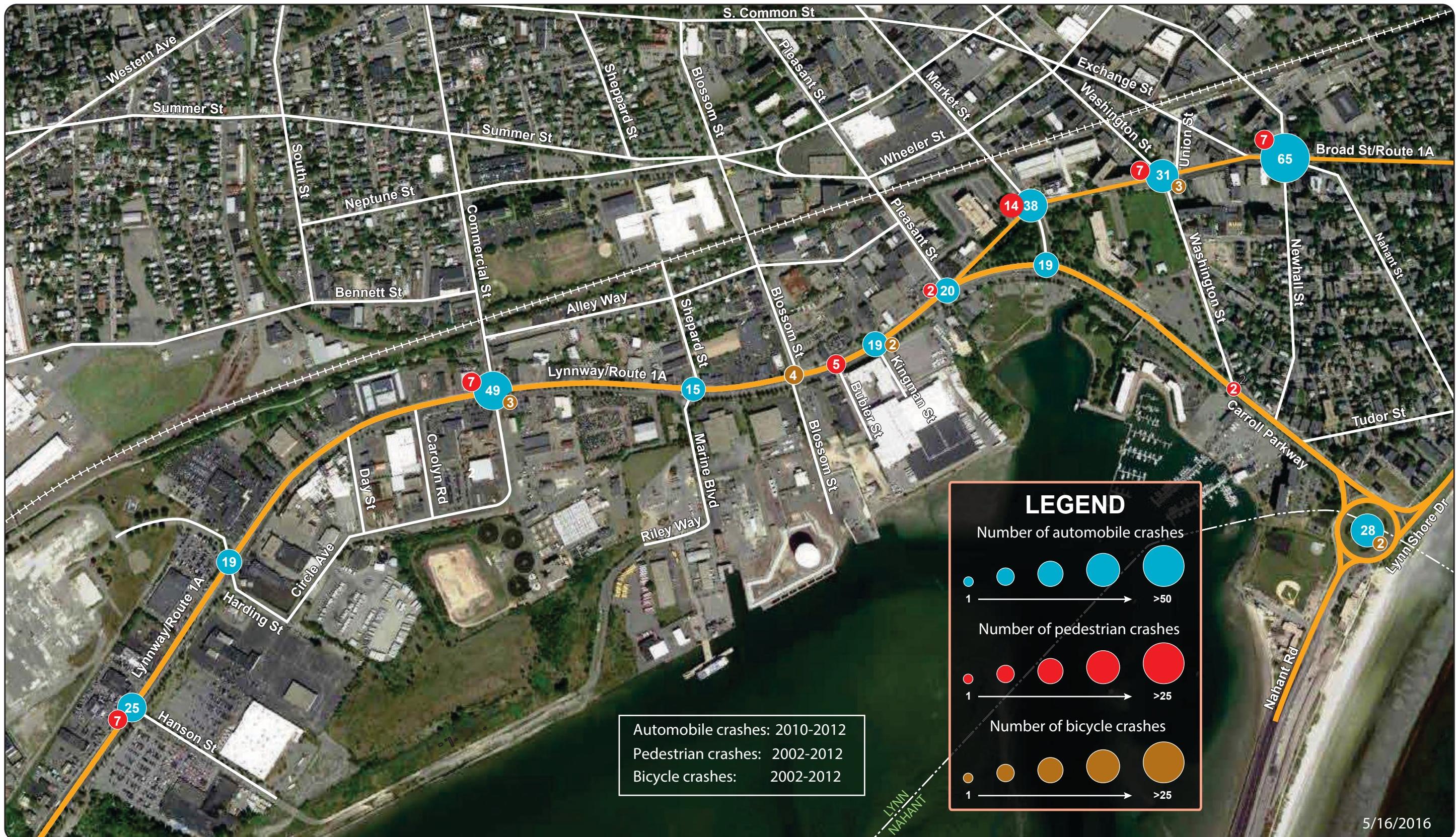








**FIGURE 11**  
Regional Transit Service





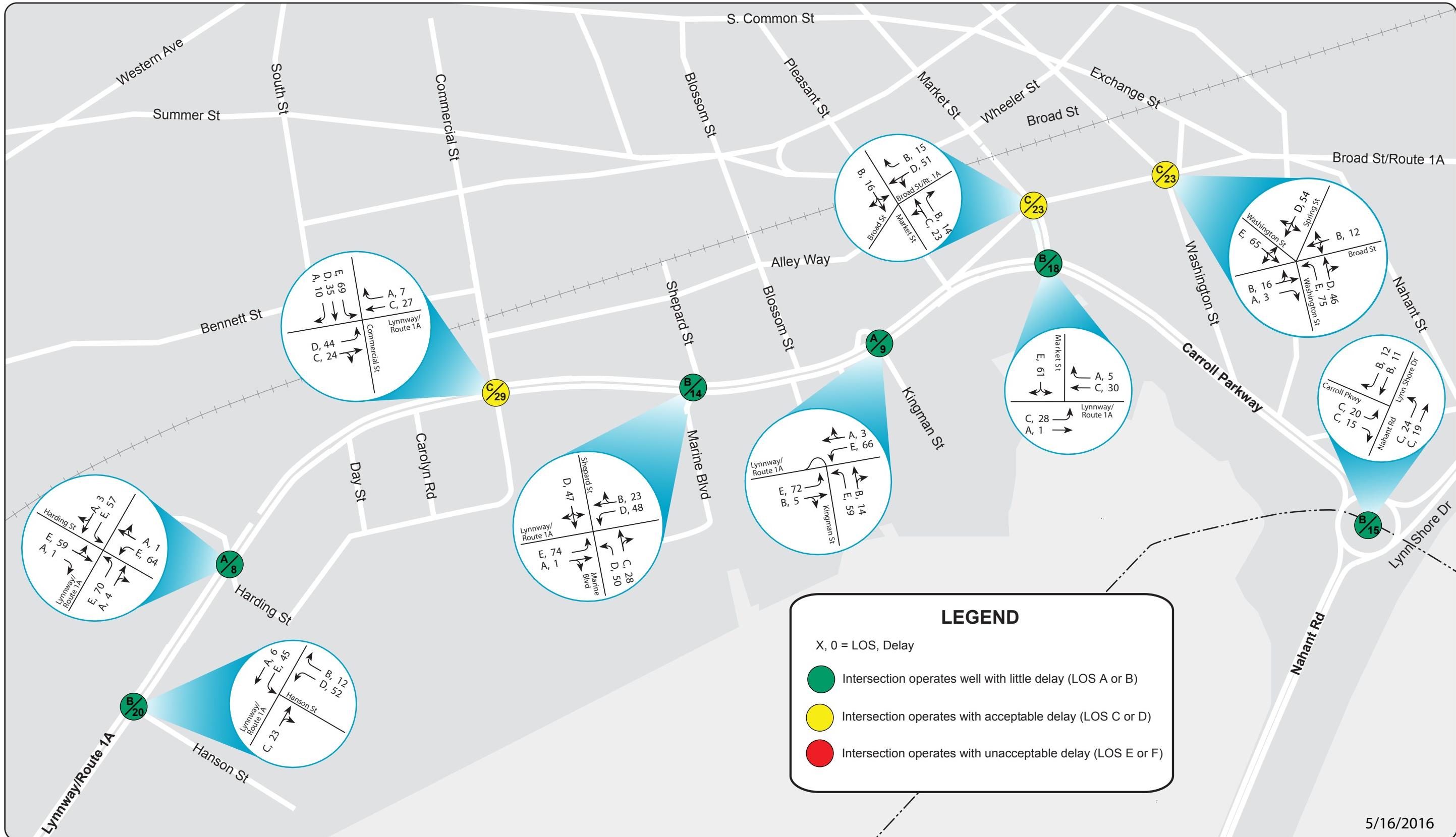


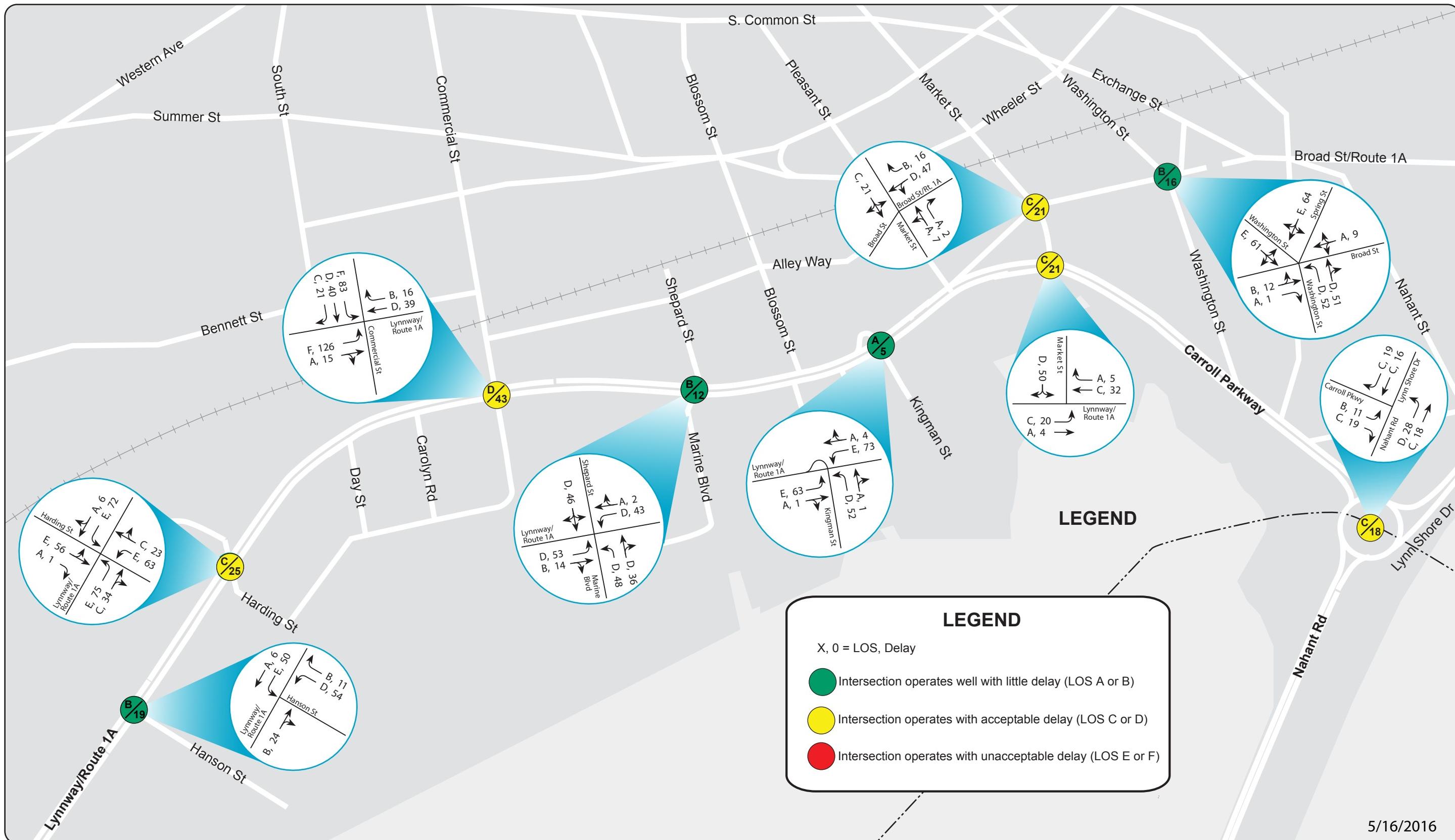
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**FIGURE 14**  
**Existing Conditions**  
**Weekday AM Peak Hour Level of Service and Delays**

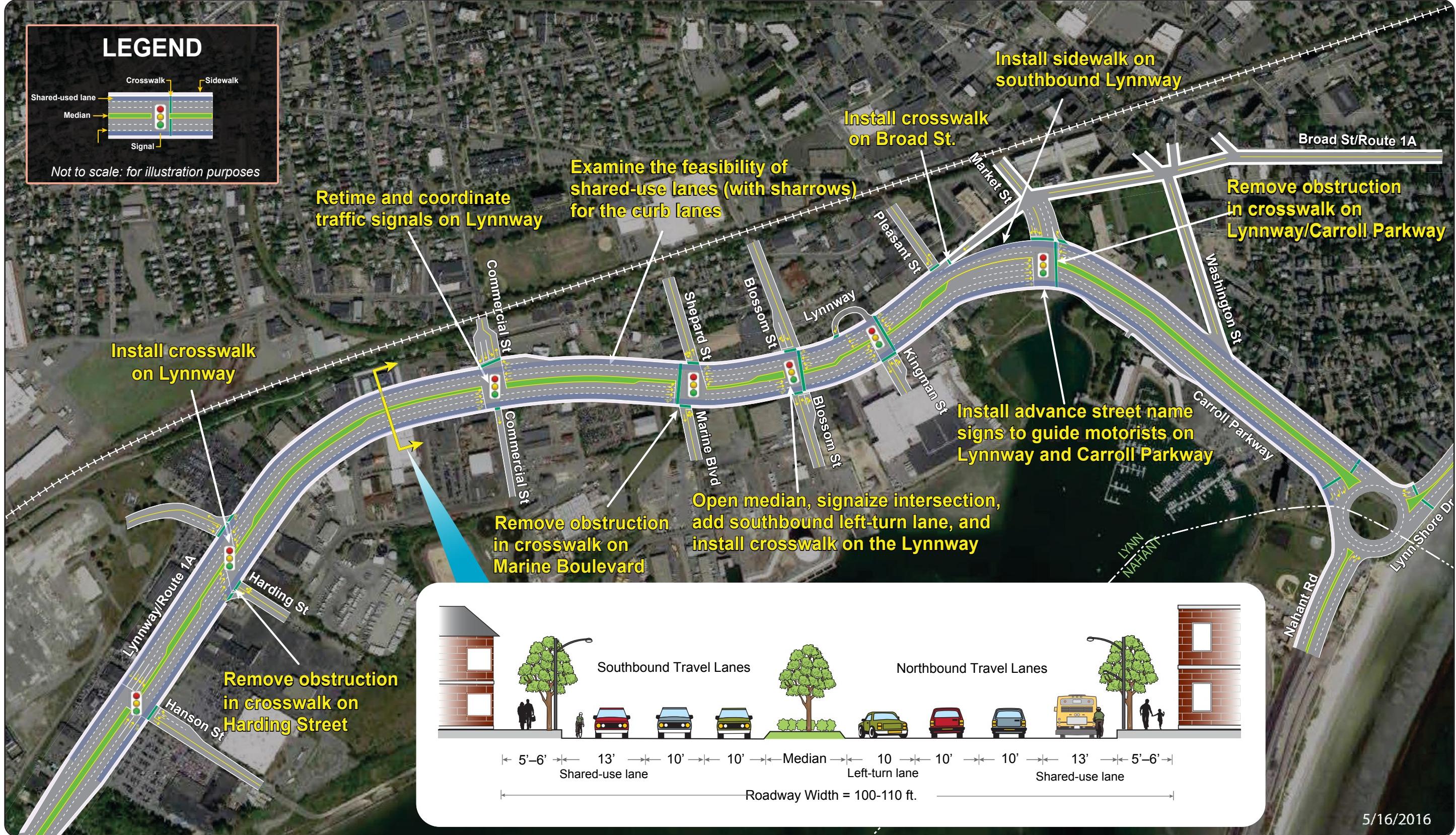
Route 1A/Lynnway/Carroll Parkway  
Priority Corridor Study in Lynn



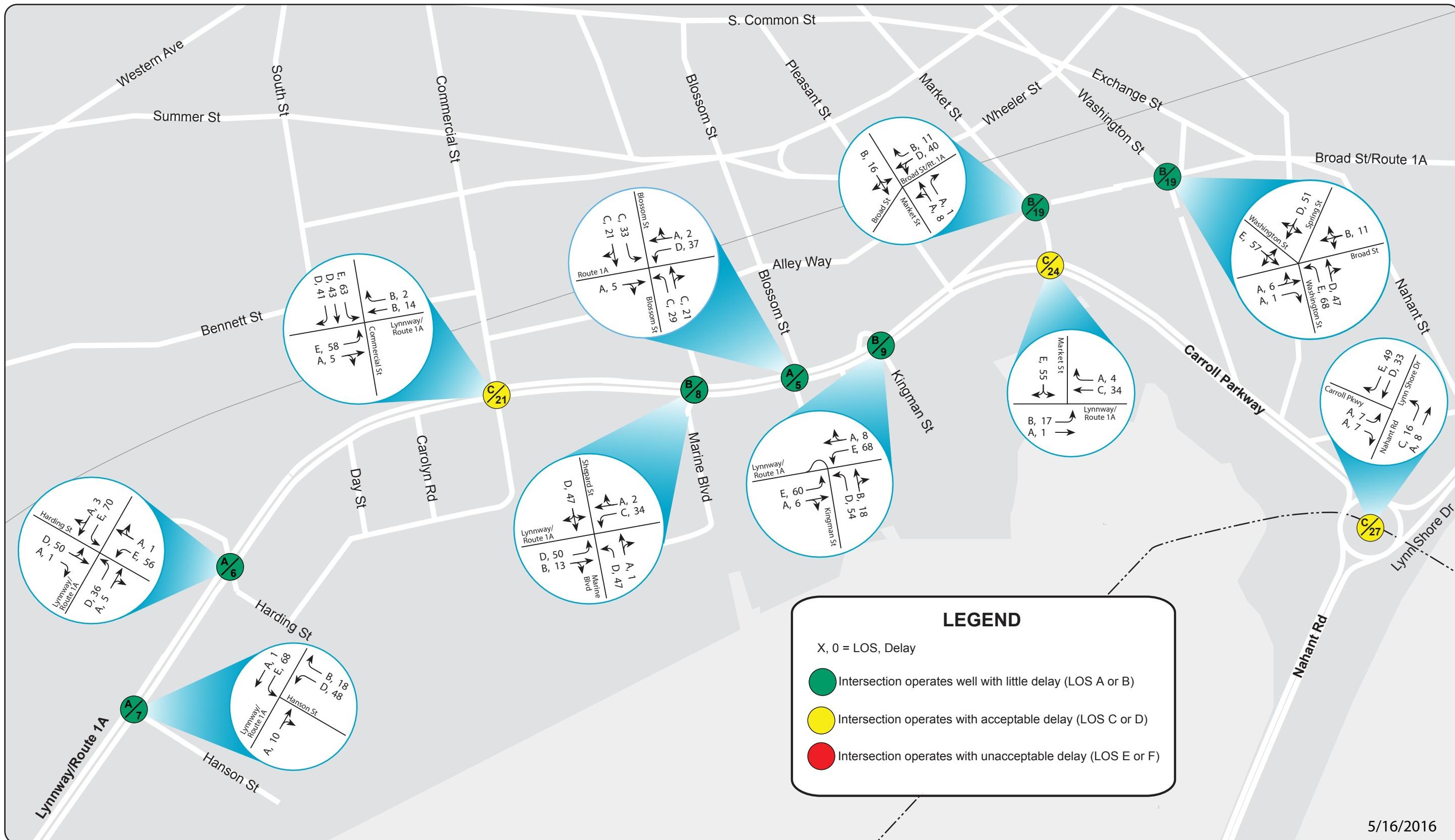


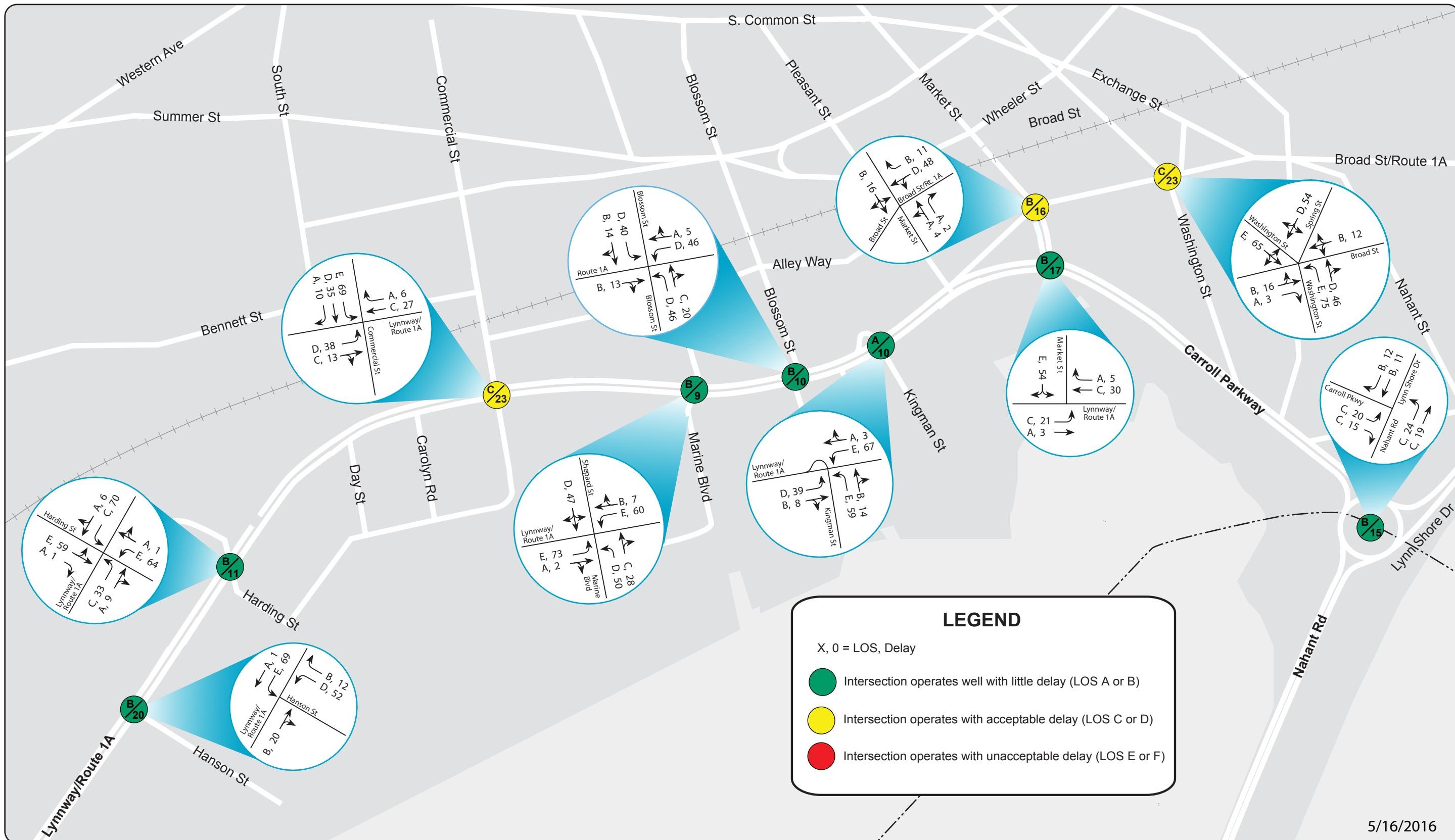


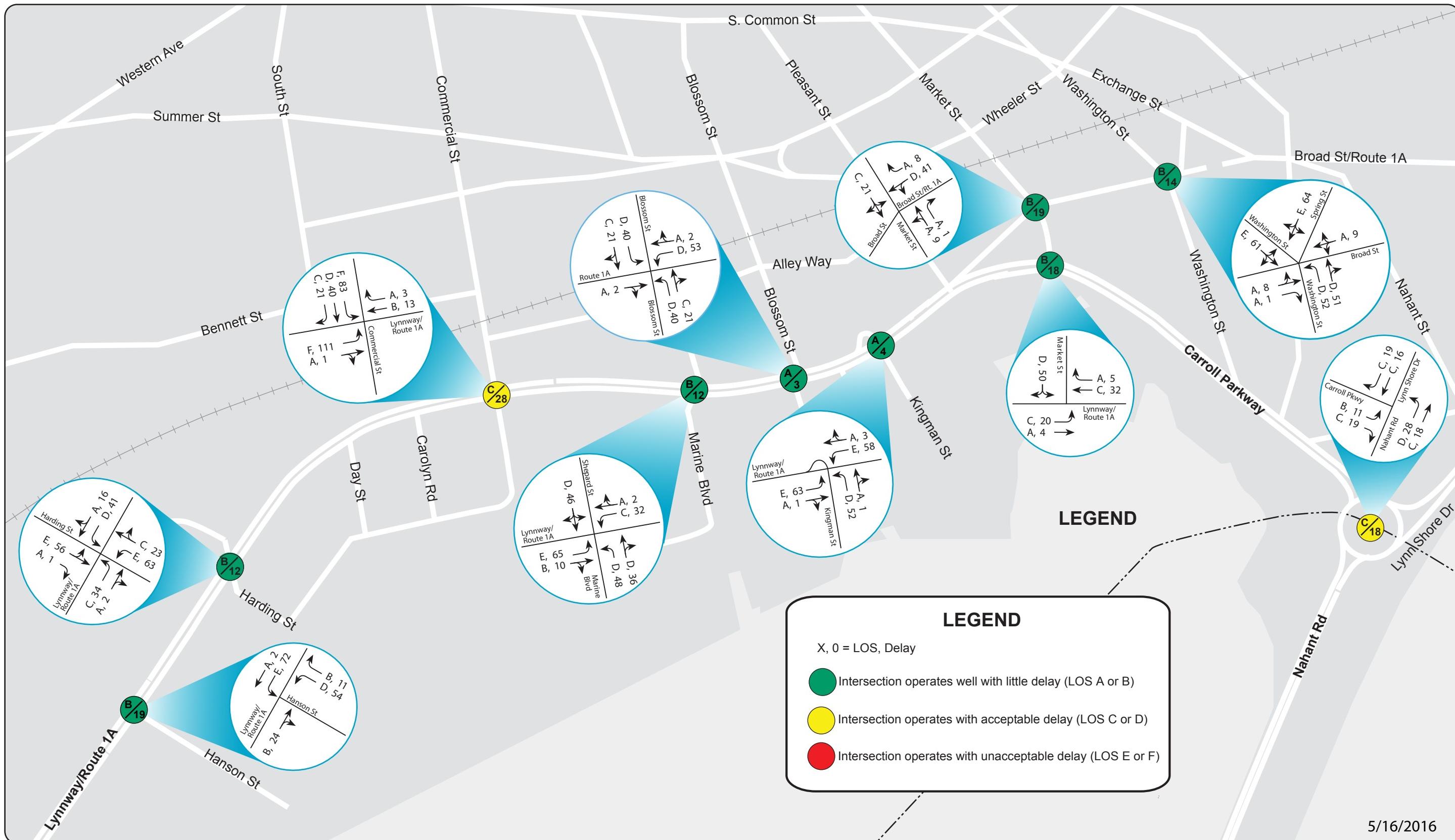












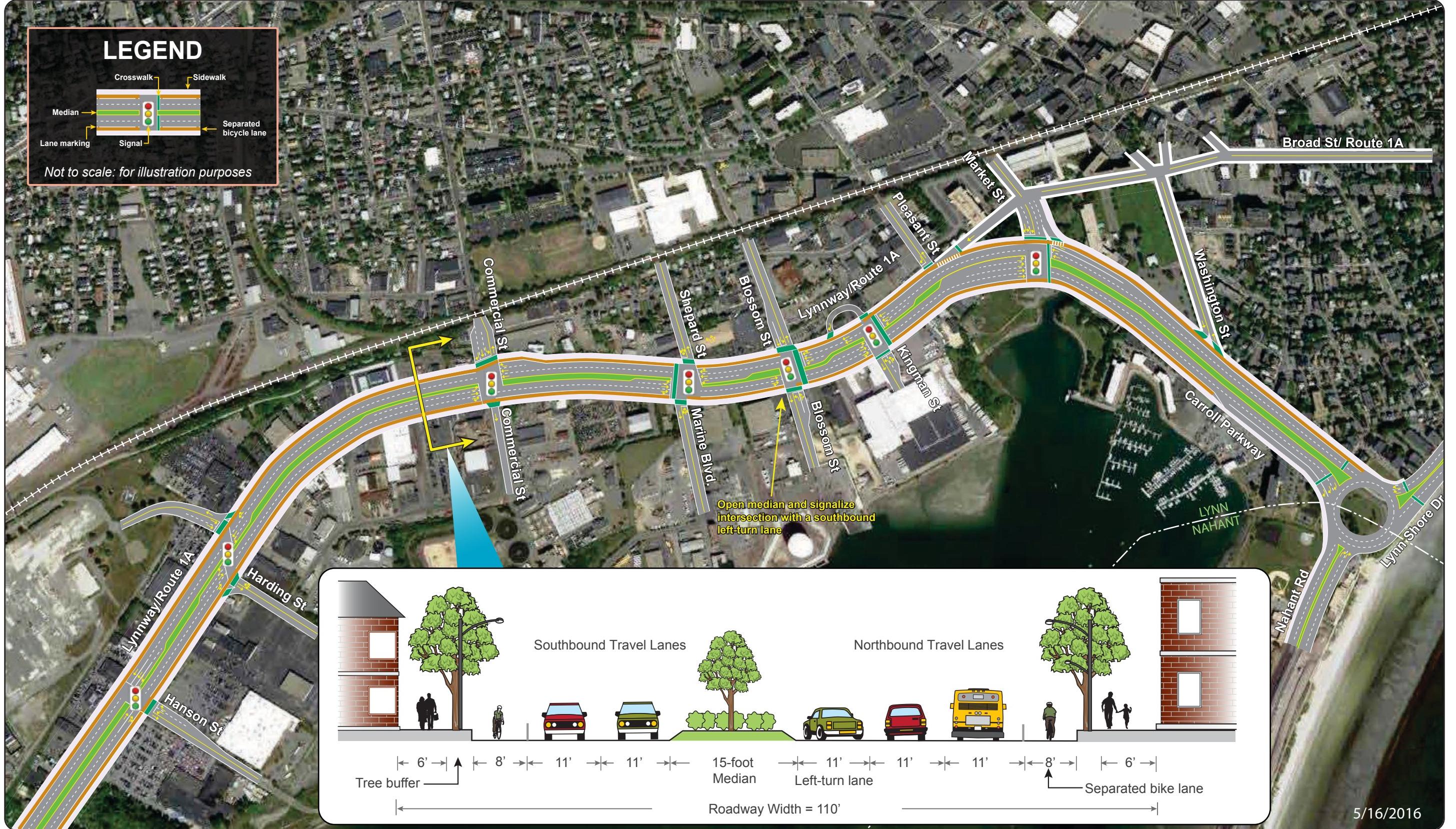
### LEGEND

- | X, 0 = LOS, Delay  |
|--|
| ● Intersection operates well with little delay (LOS A or B)  |
| ● Intersection operates with acceptable delay (LOS C or D)   |
| ● Intersection operates with unacceptable delay (LOS E or F) |

### LEGEND



**FIGURE 23**  
Alternative 1: Saturday PM Peak Hour Level of Service and Delays

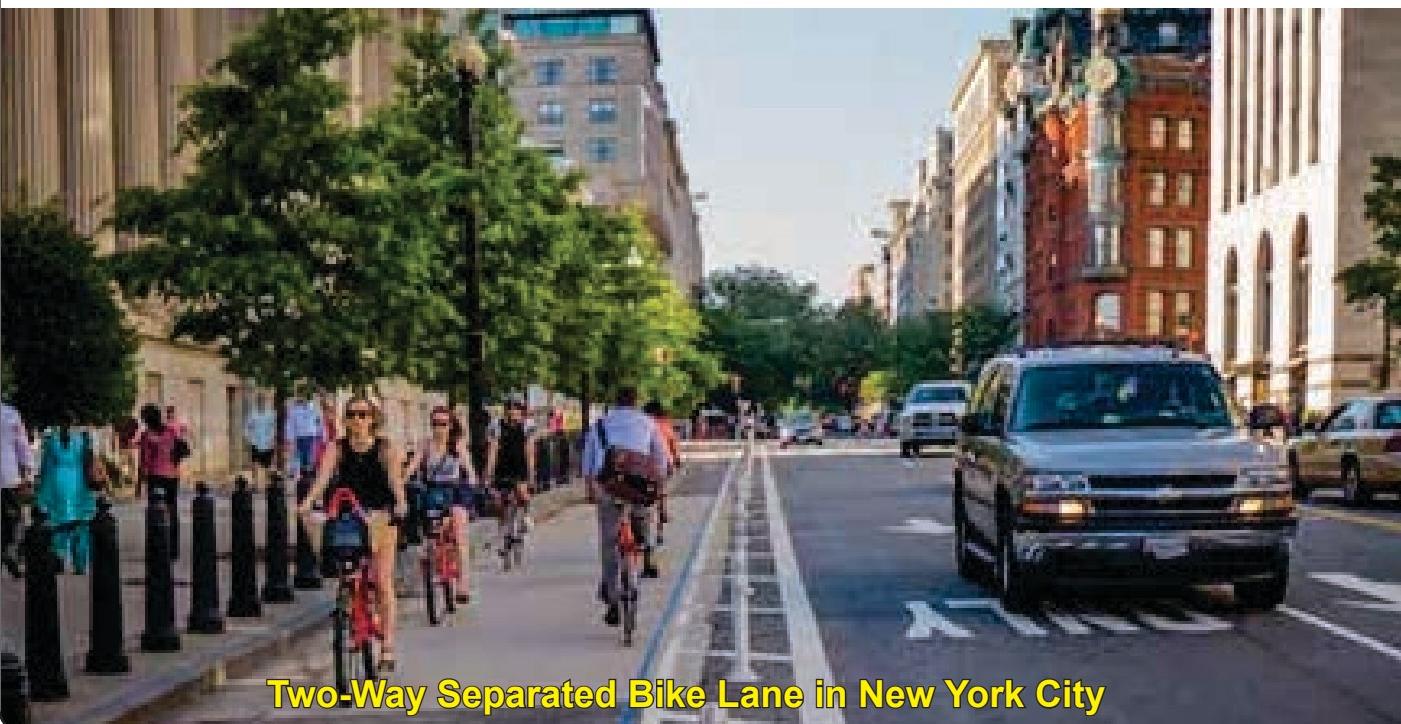




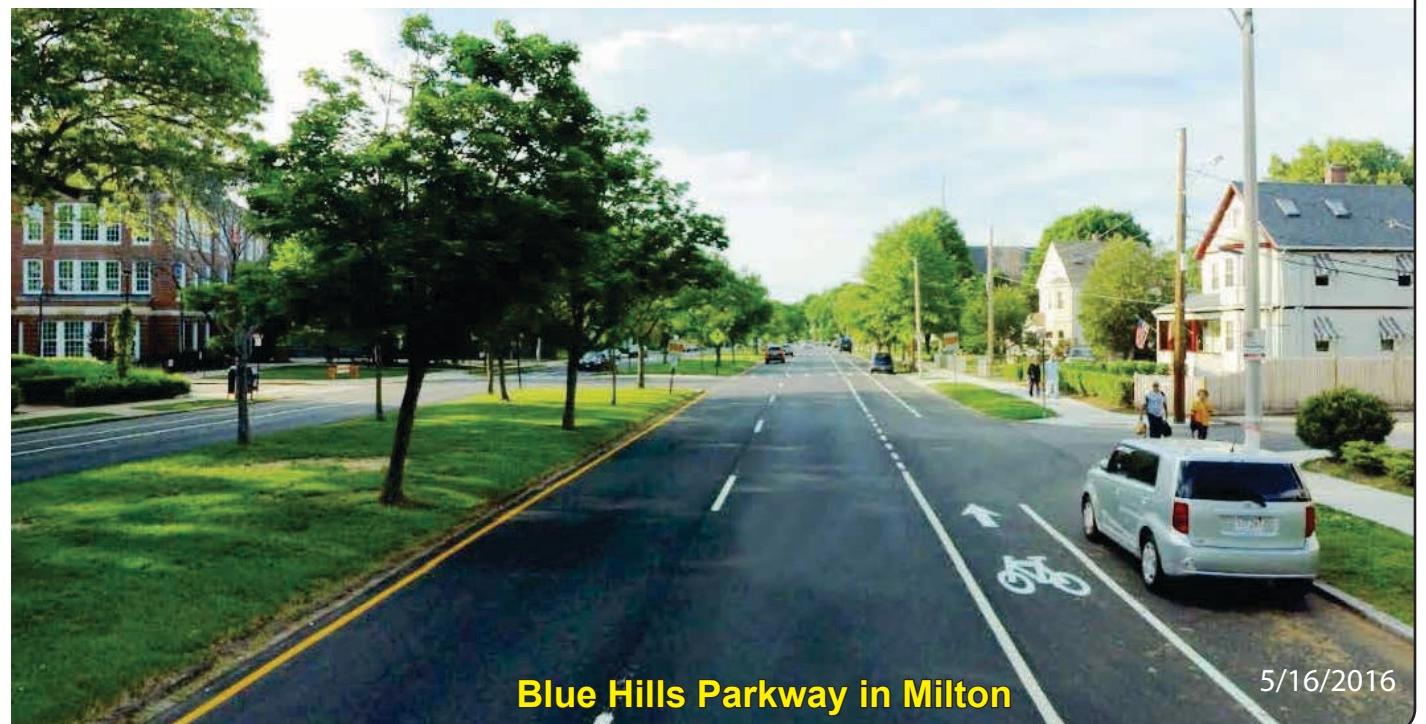
Veterans of Foreign Wars (VFW) Parkway in West Roxbury



Two-Way Separated Bike Lane in Vancouver, Canada

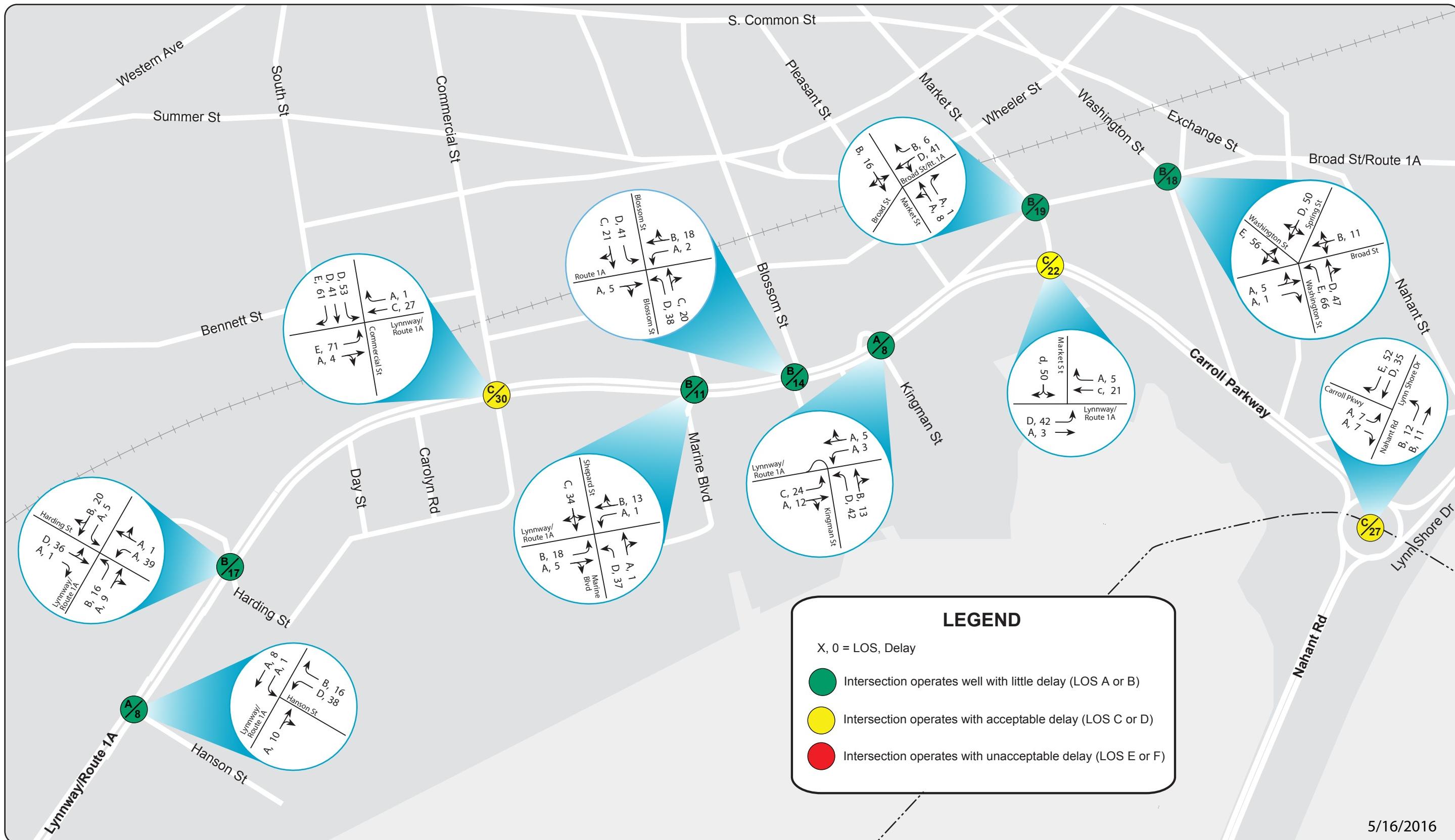


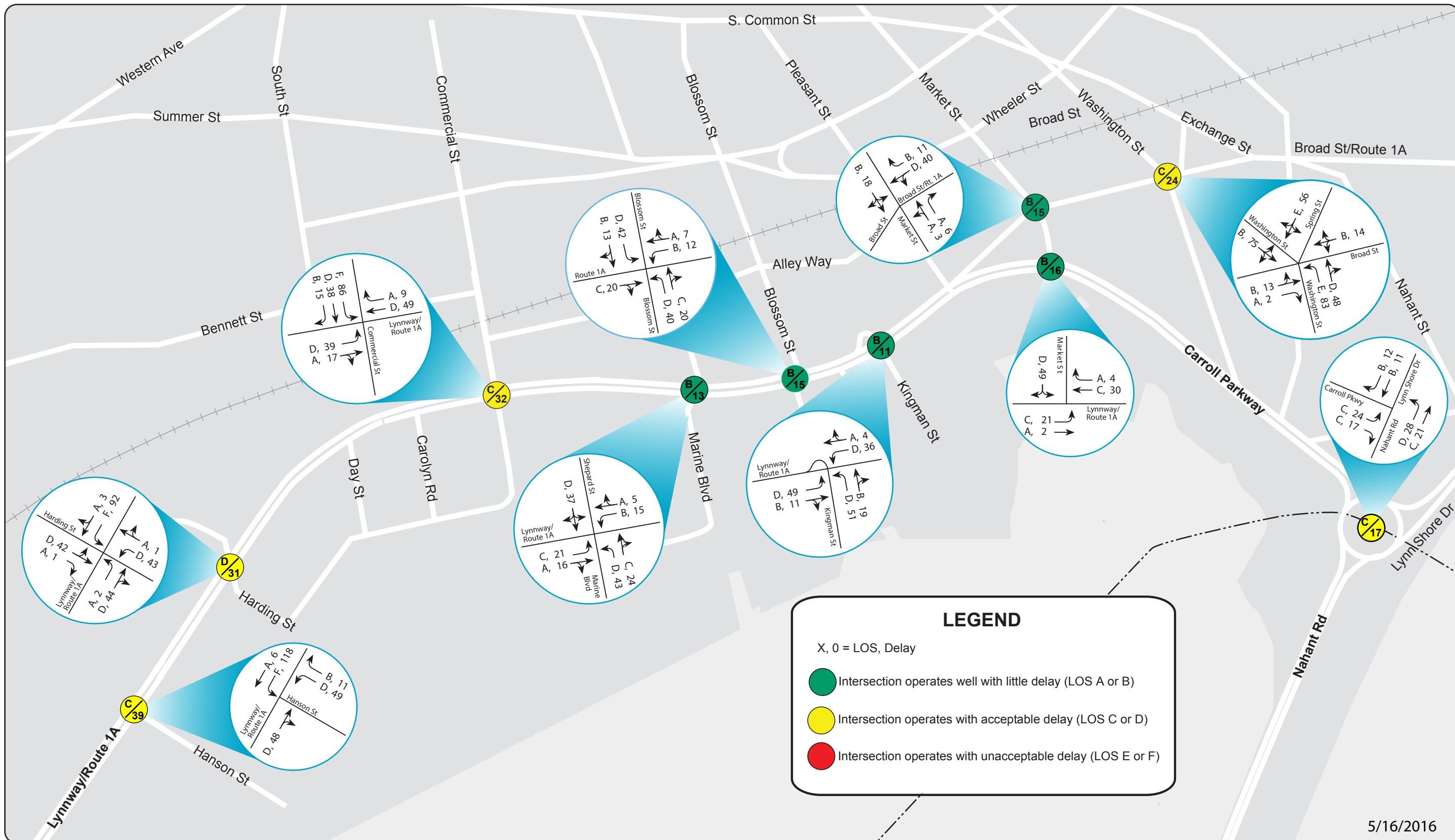
Two-Way Separated Bike Lane in New York City

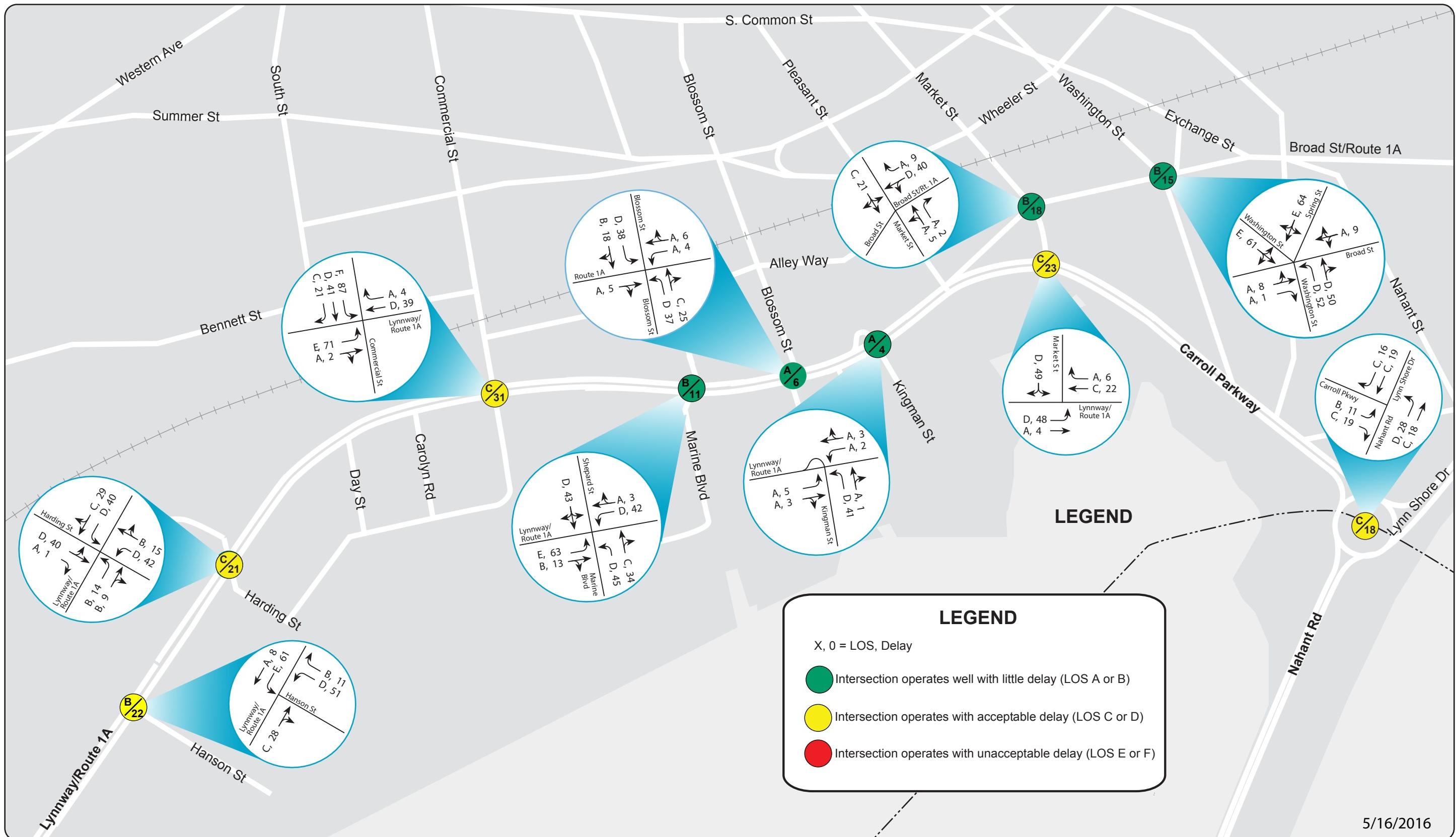


Blue Hills Parkway in Milton

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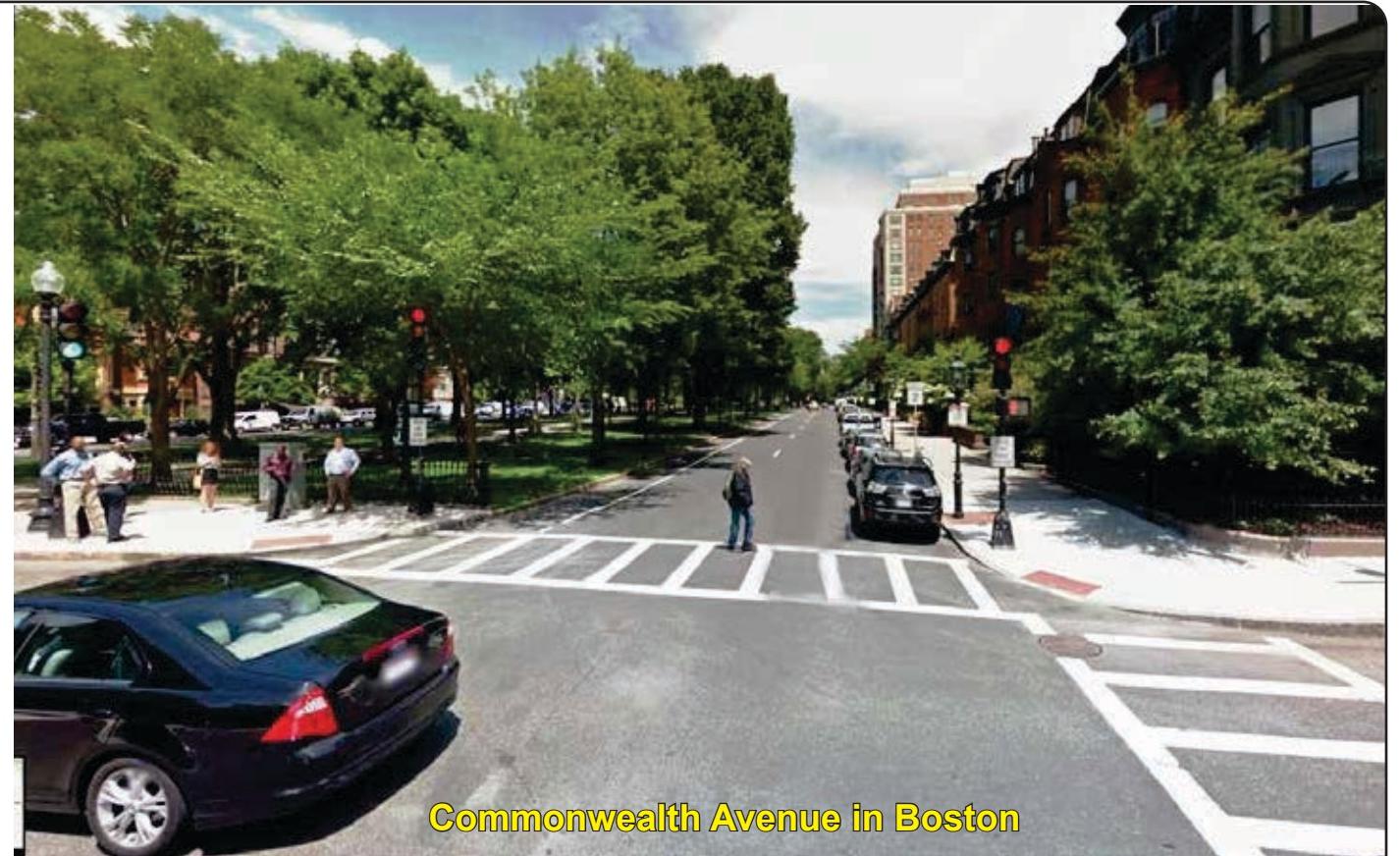








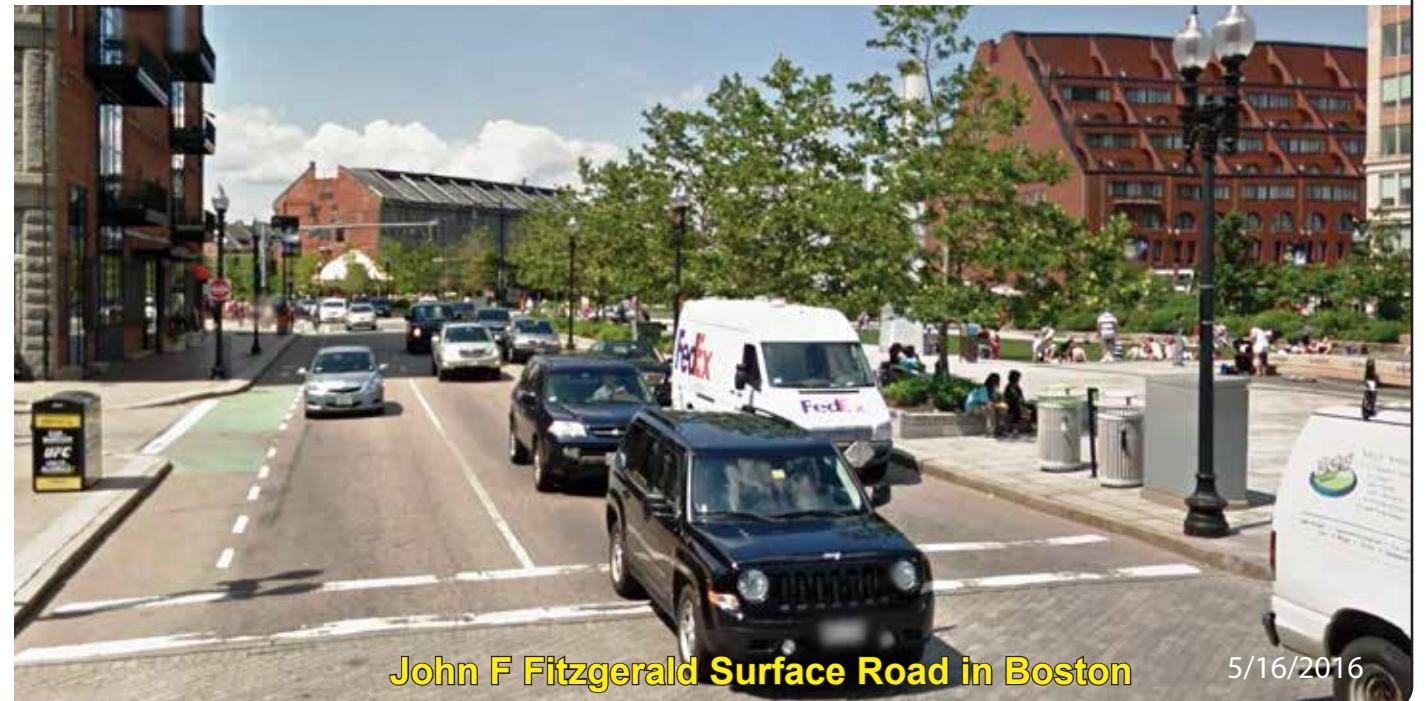
North Common Street and South Common Street in Lynn



Commonwealth Avenue in Boston



North Common Street and South Common Street in Lynn



John F Fitzgerald Surface Road in Boston

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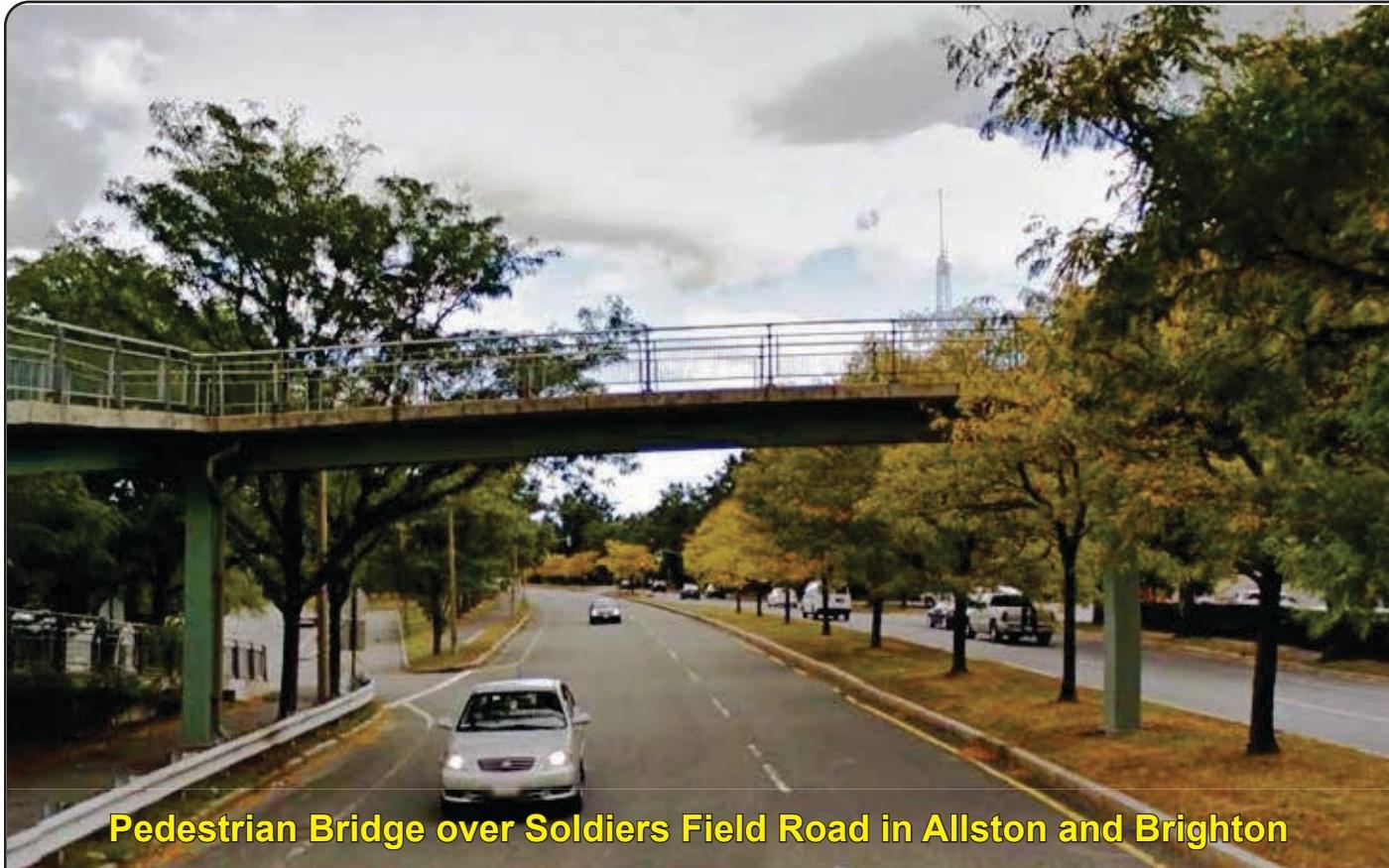


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MPO

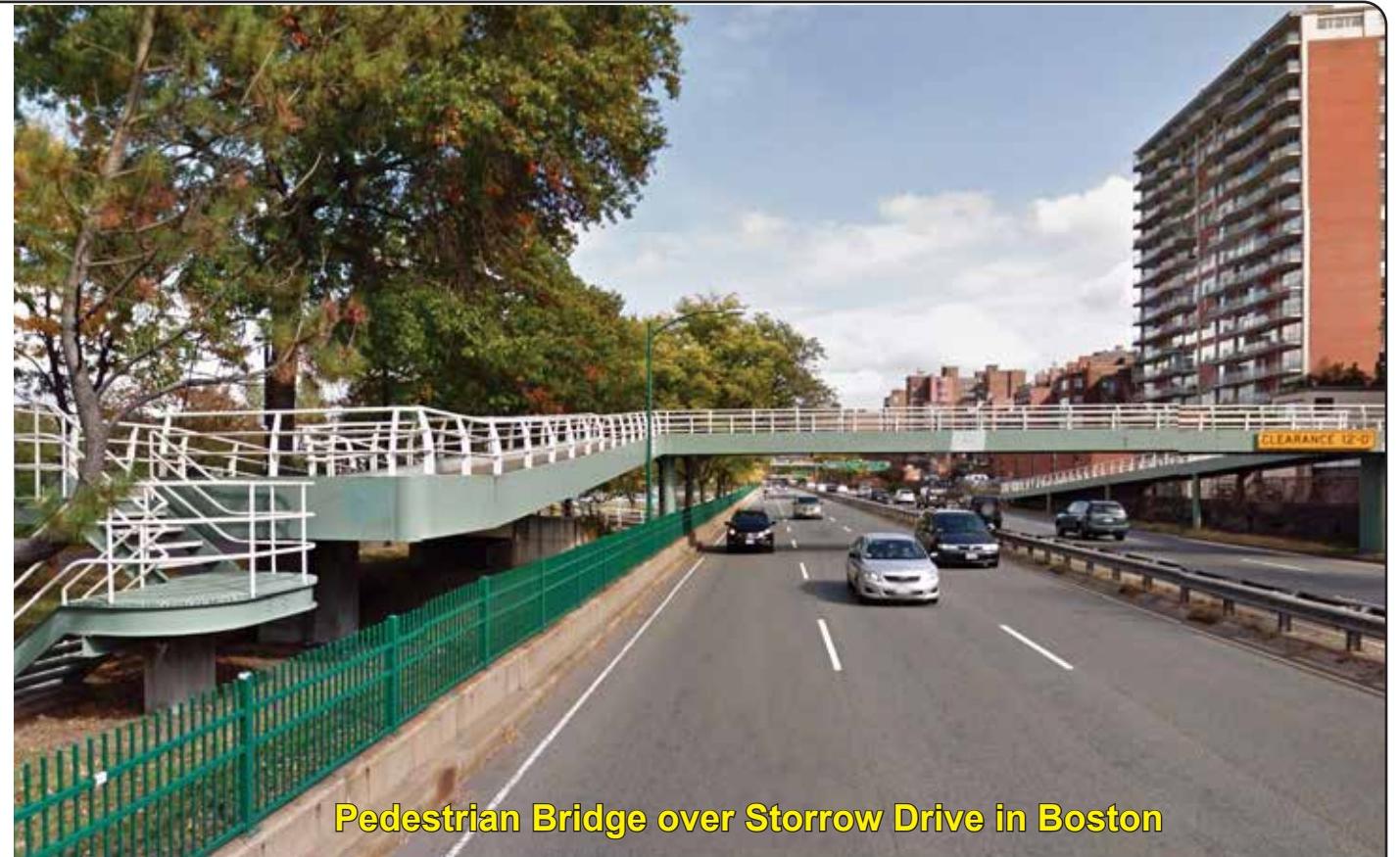


**FIGURE 31**  
**Alternative 4: Pedestrian Bridges**

Route 1A/Lynnway/Carroll Parkway  
Priority Corridor Study in Lynn



Pedestrian Bridge over Soldiers Field Road in Allston and Brighton



Pedestrian Bridge over Storrow Drive in Boston

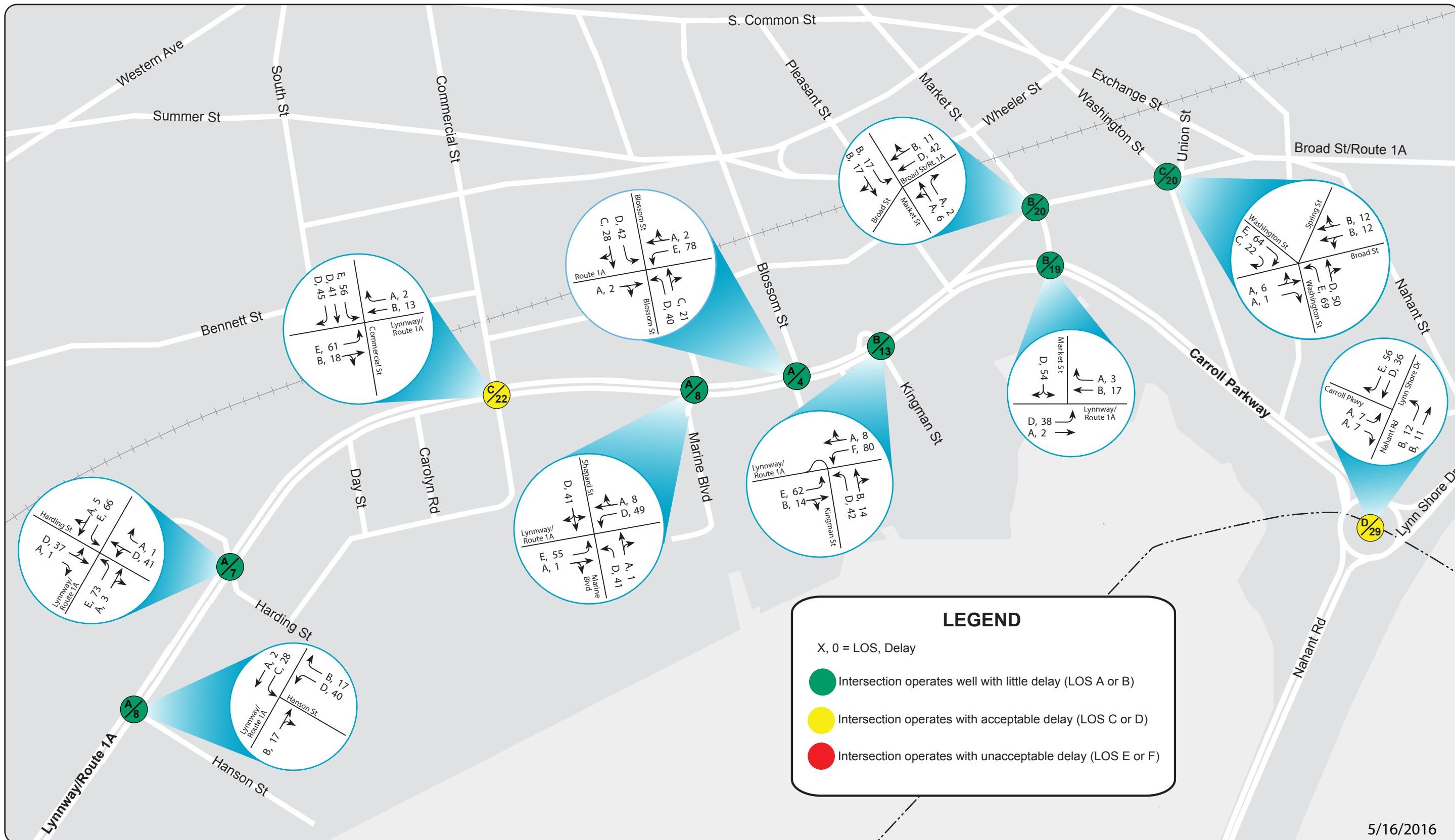


Two-Way Separated Bike Lane in Vancouver



Pedestrian Bridge over Carroll Parkway in Lynn

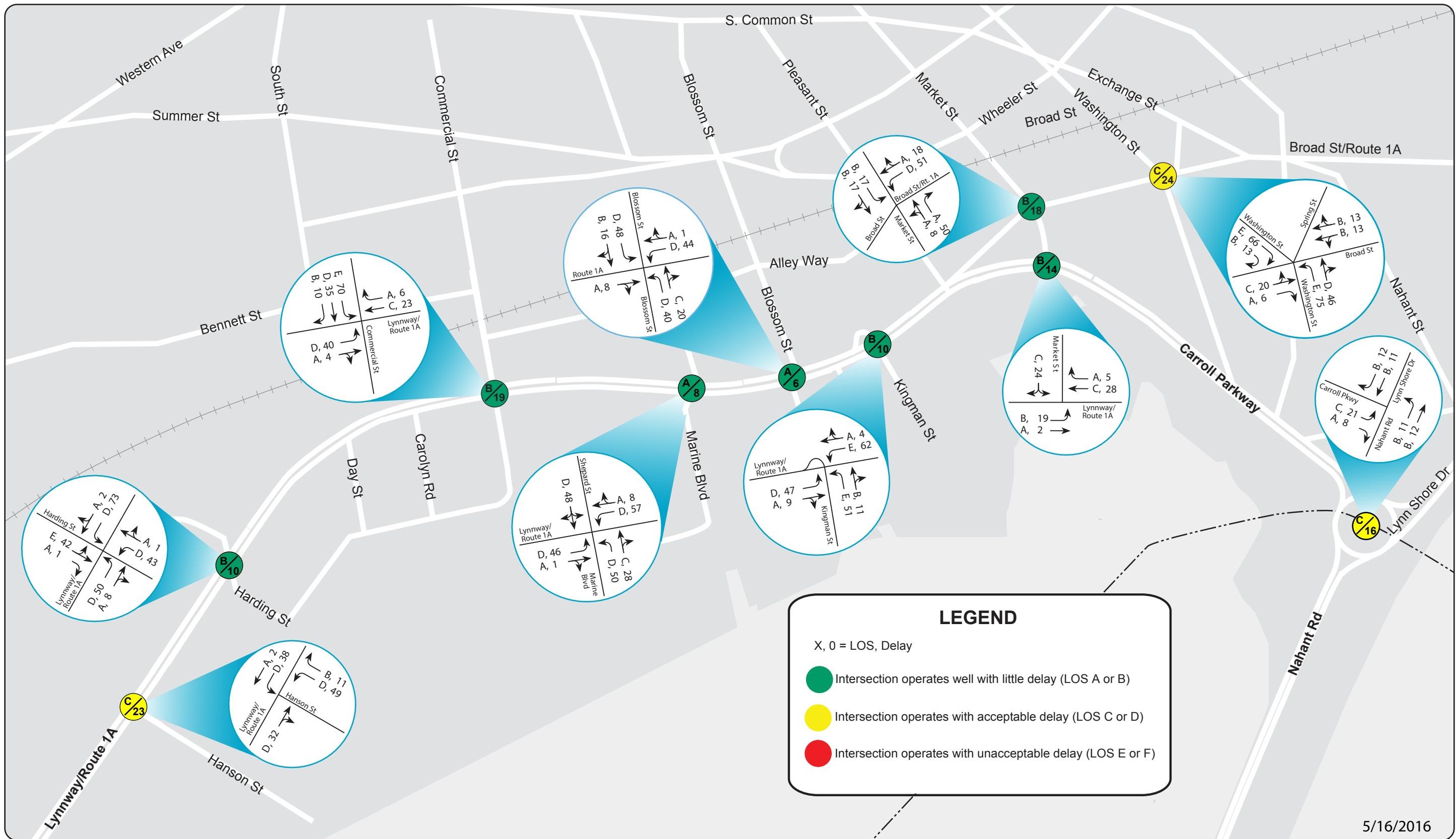
5/16/2016

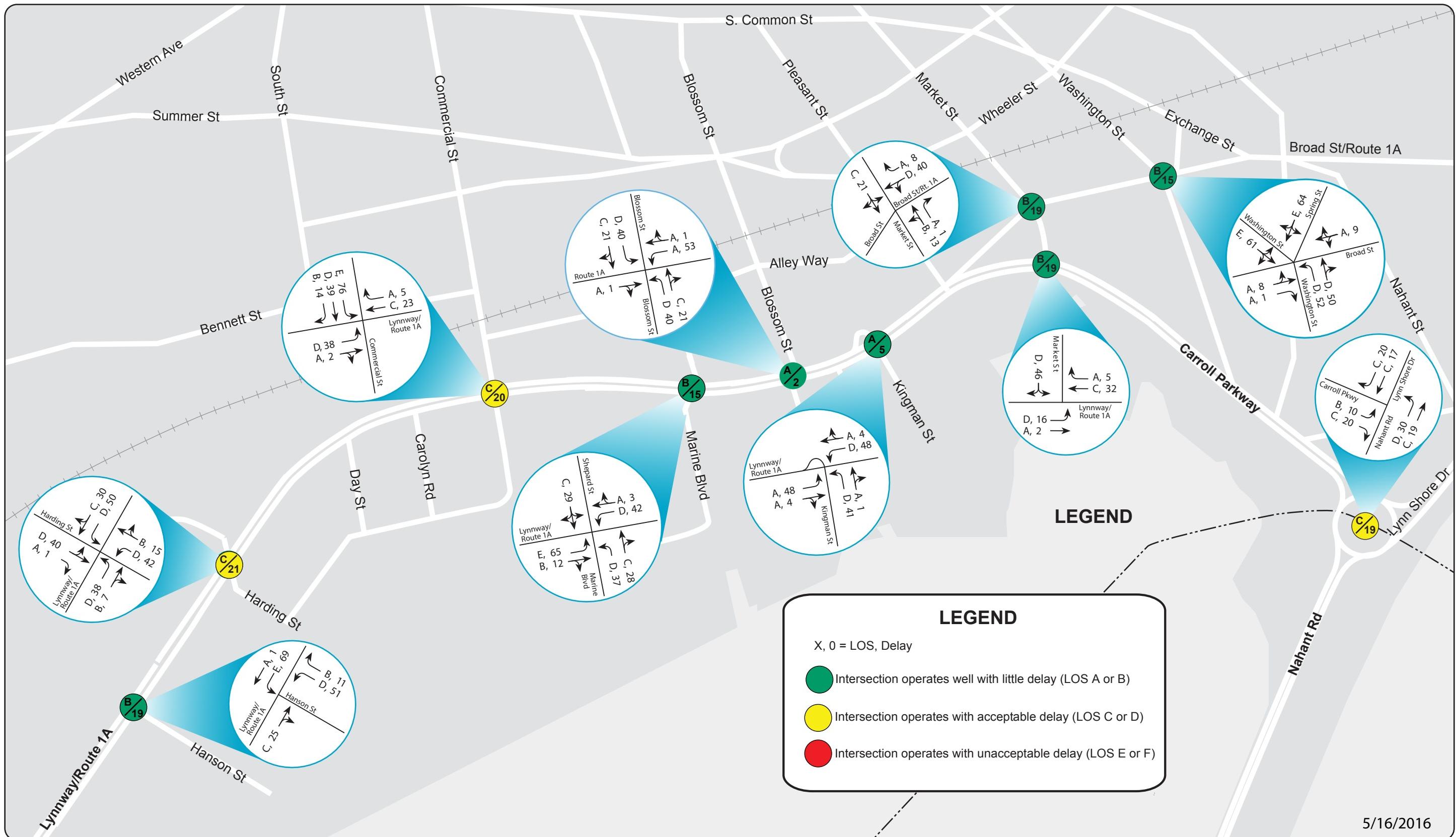


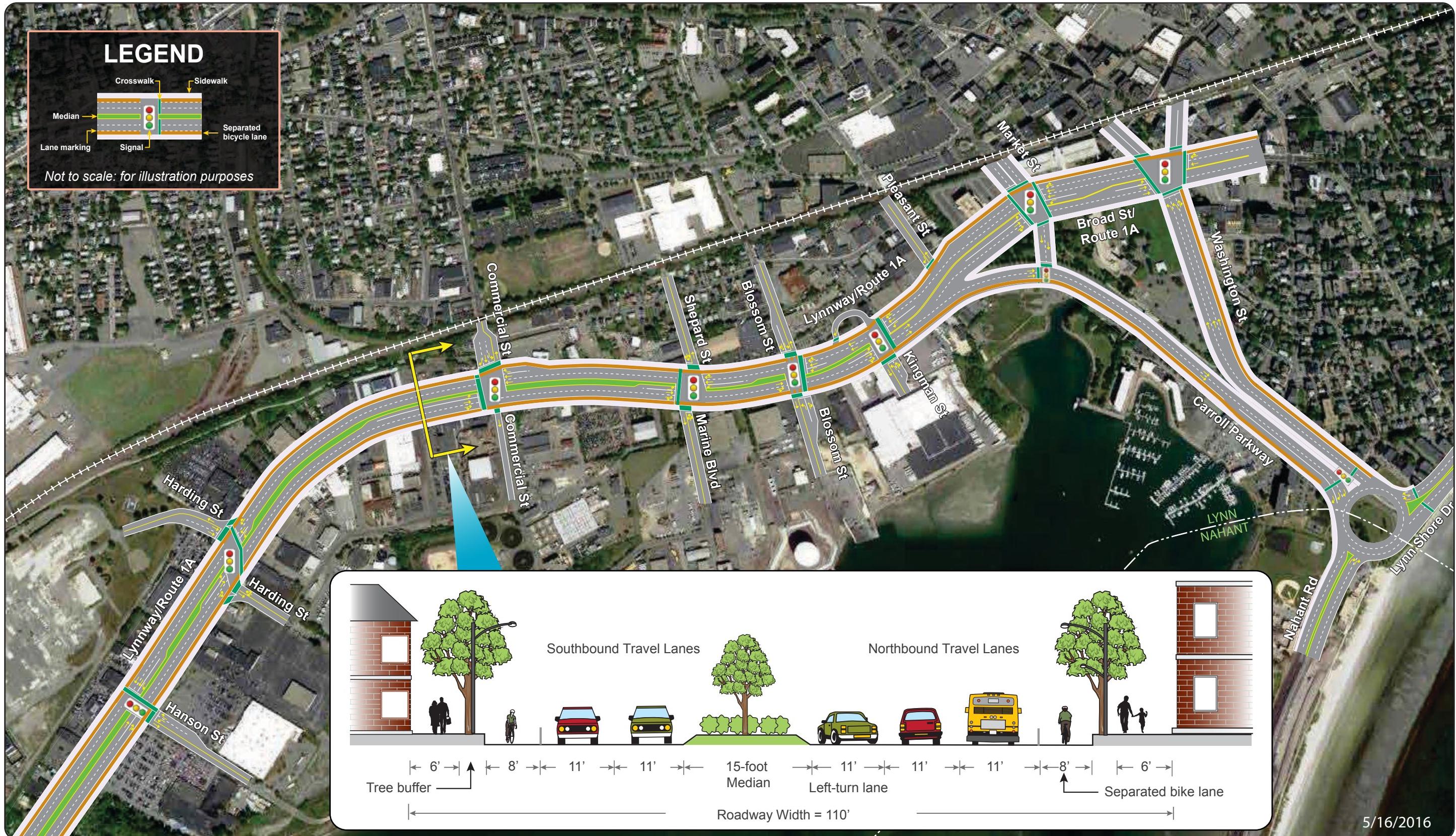
### LEGEND

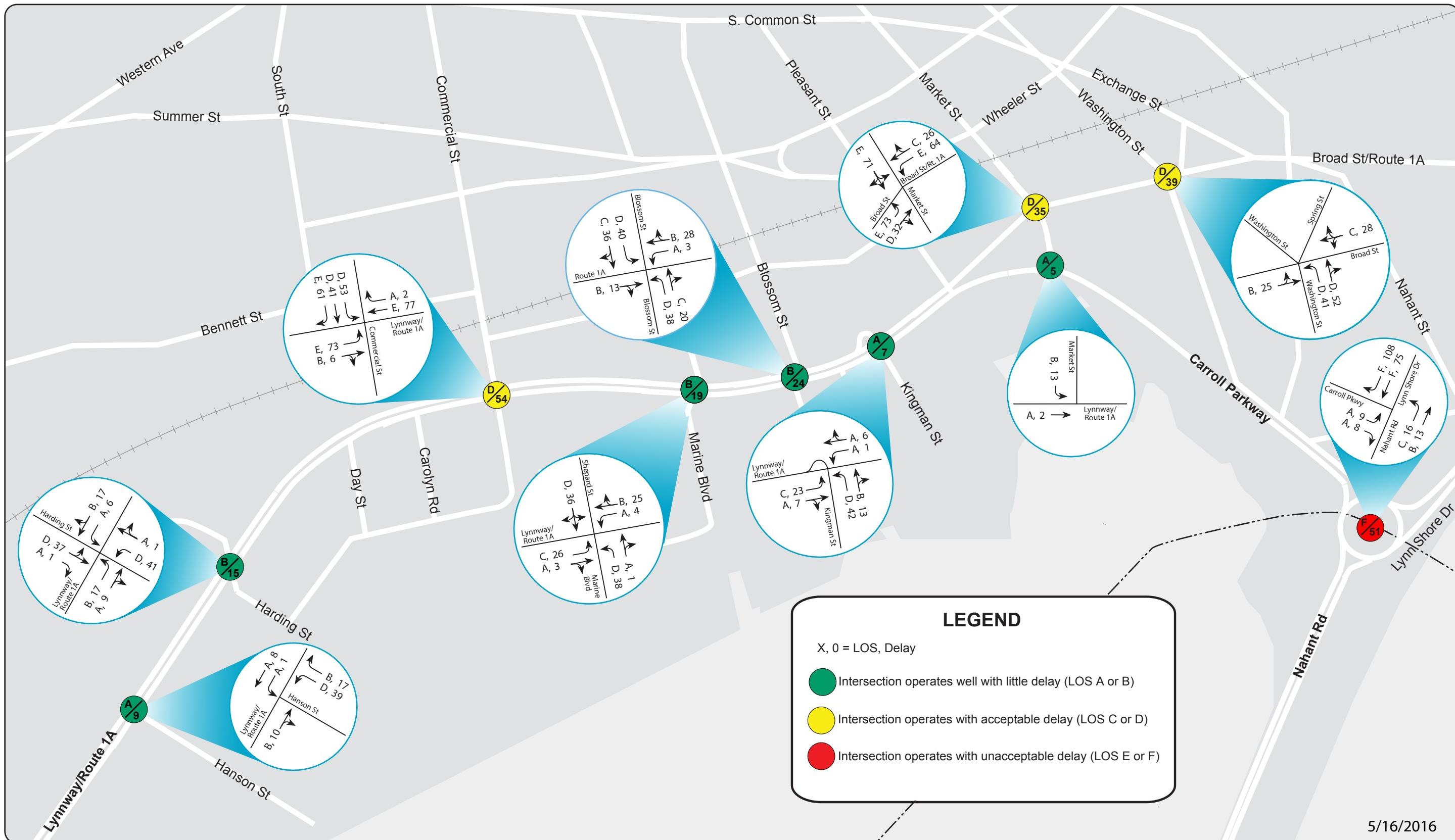
- X, 0 = LOS, Delay
- Intersection operates well with little delay (LOS A or B)
- Intersection operates with acceptable delay (LOS C or D)
- Intersection operates with unacceptable delay (LOS E or F)

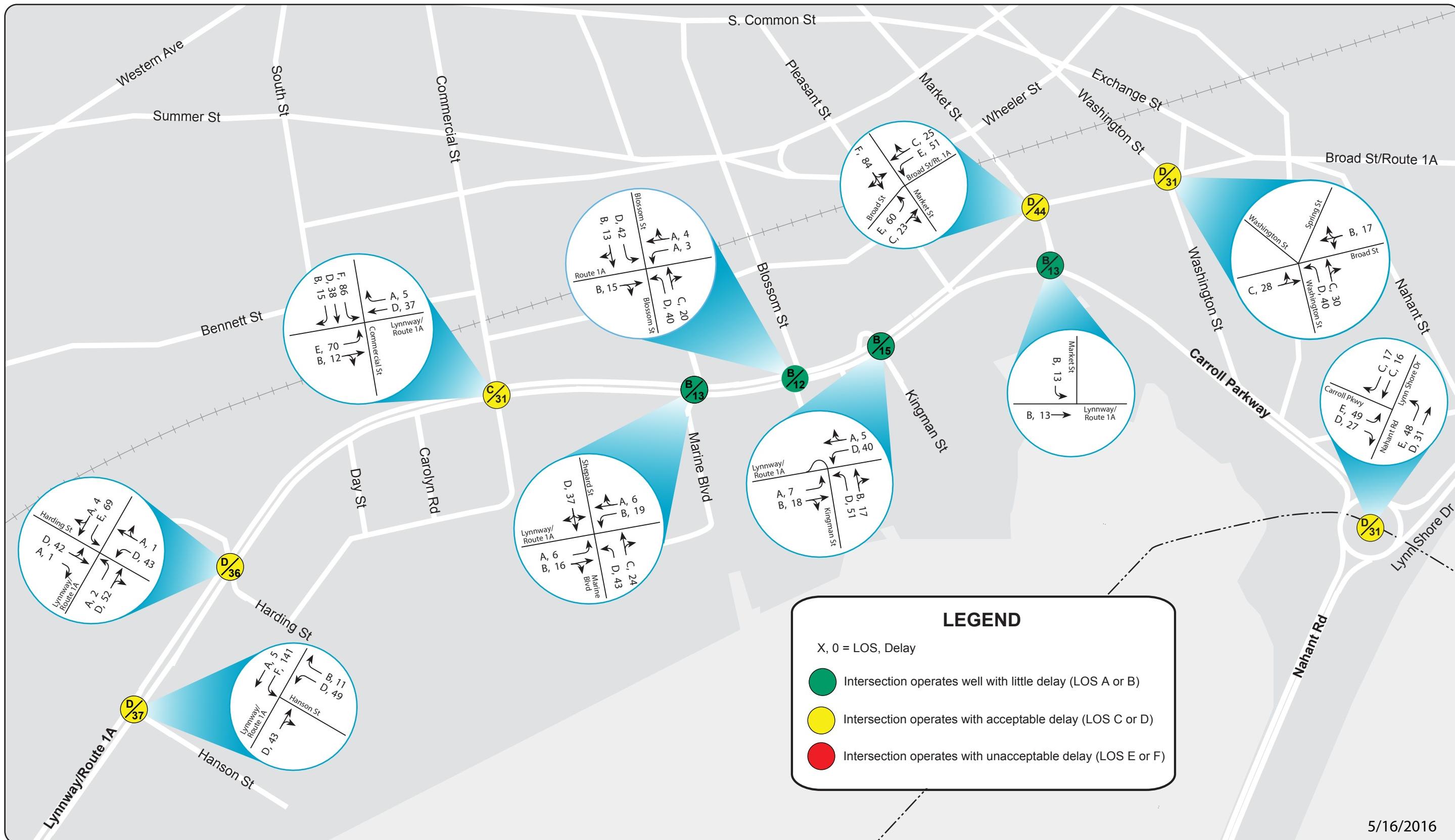
5/16/2016

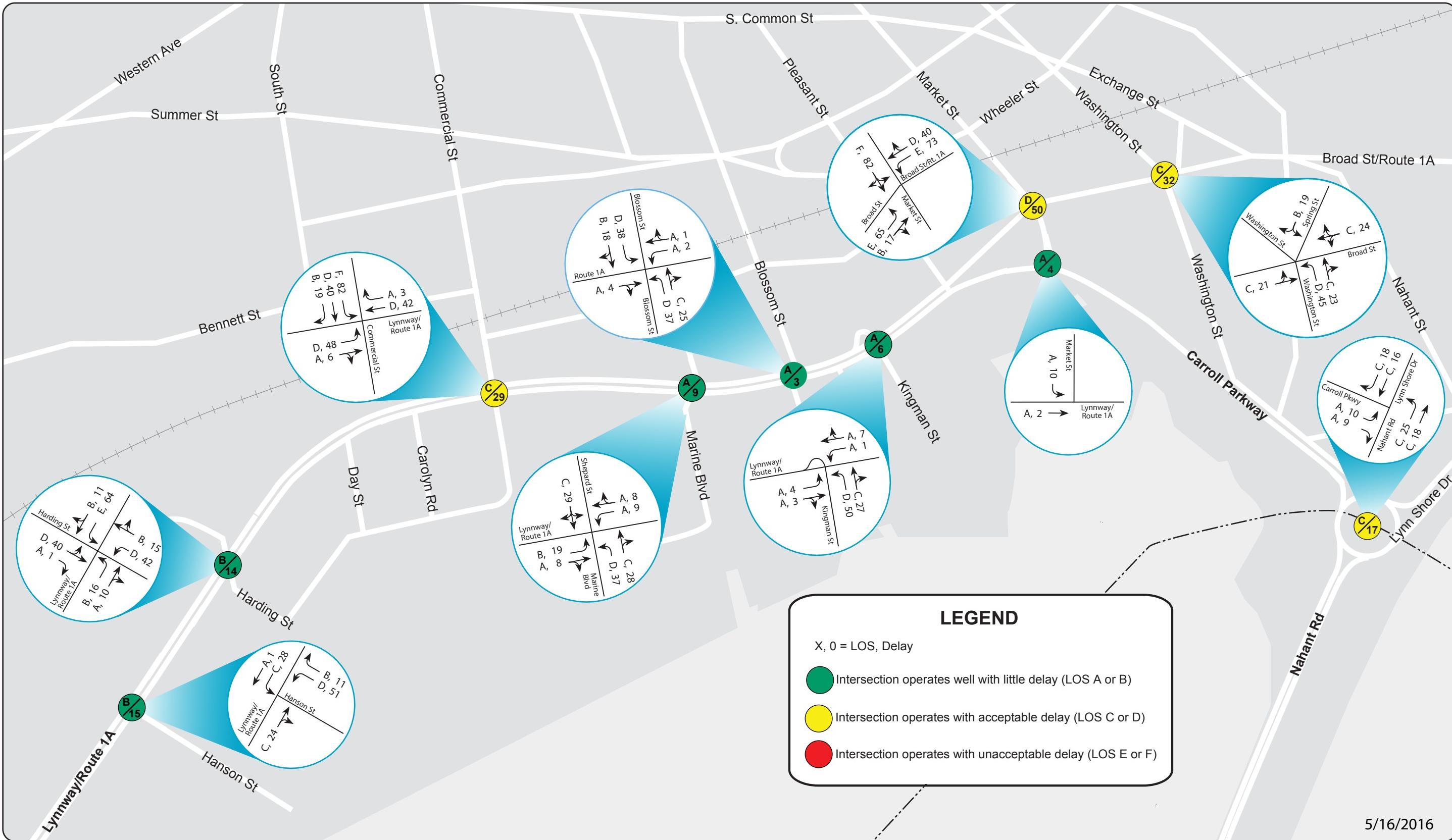










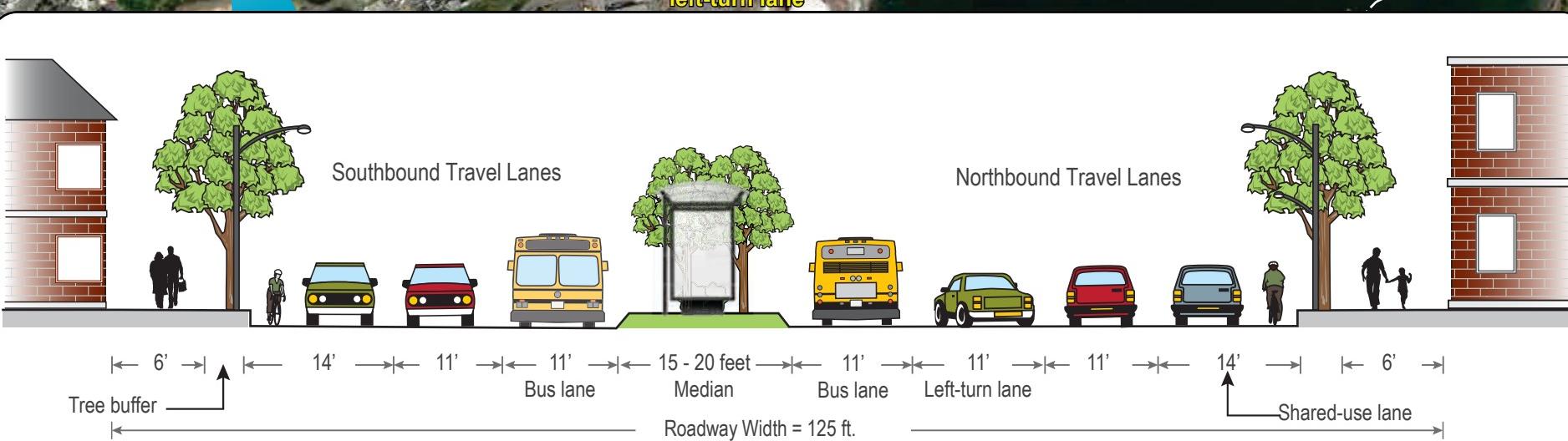


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**FIGURE 39**

*Route 1A/Lynnway/Carroll Parkway  
Priority Corridor Study in Lynn*



Route 1A/Lynway/Carroll Parkway  
Priority Corridor Study in Lynn



5/16/2016

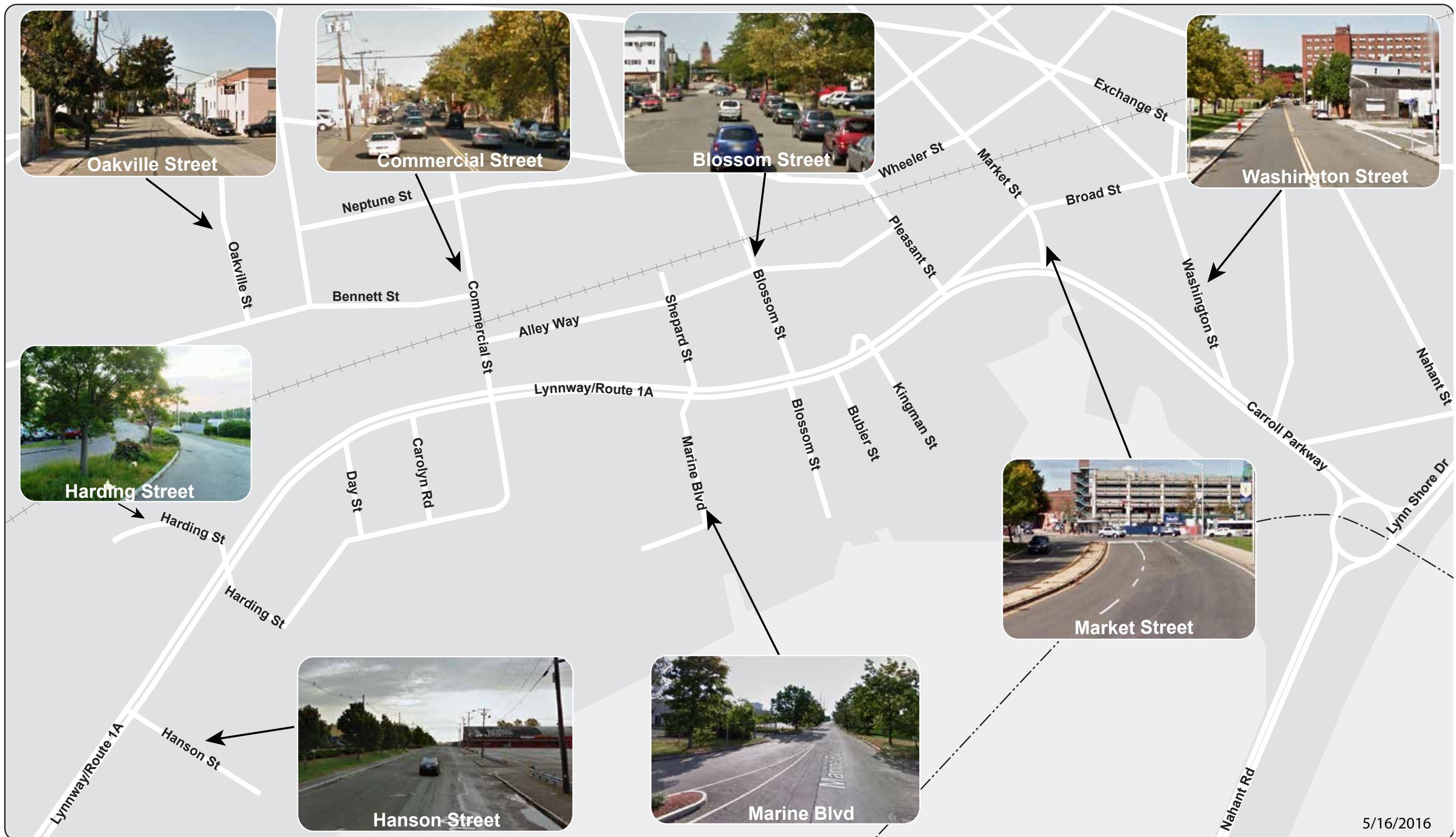


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**FIGURE 42**  
Create Connections amongst Lynn's Waterfront, Downtown, and Surrounding Neighborhoods

Route 1A/Lynnway/Carroll Parkway  
Priority Corridor Study in Lynn



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**FIGURE 43**  
Roadway Characteristics of the Local Streets that are Candidates for Improvements  
to Help Create Connectivity Amongst the Study Area's Land Uses

Route 1A/Lynnway/Carroll Parkway  
Priority Corridor Study in Lynn

# Appendices

# **APPENDIX A**

## **Advisory Task Force**

**Initial Scoping Meeting Summary**  
**Route 1A/Lynnway/Carroll Parkway Study in Lynn**  
**City Hall, Room 302**  
**April 17, 2015**

**Meeting started at 10:00 A.M.**

Participants from Lynn, MassDOT Office of Transportation Planning (OTP), MassDOT Highway Division's District 4 Office, and Central Transportation Planning Staff (CTPS) introduced themselves (see attached meeting roster).

**Study Background**

Mark Abbott of CTPS introduced the Boston Region MPO and the study background.

- The study is supported by funding from the Boston Region Metropolitan Planning Organization (MPO). The MPO is responsible for conducting federally required metropolitan transportation planning process. The work of the MPO is conducted by CTPS, staff to the MPO.
- The Boston Region MPO's Long-Range Transportation Plan (LRTP), *Charting Progress to 2040*, identified needs for all modes of transportation in the MPO region. The LRTP identified arterial segments where roadways need improvements and modernization.
- The objectives of this study are to identify safety, mobility, access, and other transportation-related problems in the corridor and to develop multimodal solutions to the problems, including increasing the quantity and quality of walking and biking.
- CTPS went through an extensive and comprehensive process and selected this corridor from over 50 arterial segments in the MPO region for study.

**Corridor Overview**

Seth Asante provided an overview of the corridor based on available transportation data. The major roadway characteristics are summarized as below:

- Functional class: Principal Urban Arterial (Lynnway, Carroll Parkway, and Route 1A)
- Jurisdiction: Department of Conservation and Recreation (DCR)
- Six-lane divided roadway: three travel lanes in each direction with a median and left-turn lanes at selected intersections.
- About 44,000 average daily traffic on the Lynnway and 33,000 on Carroll Parkway
- Seven signalized intersections, one traffic rotary, and several unsignalized intersections and driveways

- Speed limit: 35 mph throughout the corridor
- Sidewalks on mainly both sides of the roadway
- Crosswalks only at some signalized intersections
- Very long crosswalks
- No dedicated bike lanes
- Generally no shoulders (one foot or less in width)
- Adjacent land uses: mainly commercial, industrial, and recreational.

### **Vision for the Lynn Waterfront**

- Connect the City with the waterfront
- Create open spaces along the waterfront
- Design mixed use neighborhood
- Transform the Lynnway into a pedestrian friendly boulevard
- Upgrade the traffic system to be more pedestrian-friendly
- Create a walkable, livable community that promotes human interaction

### **Study Tasks**

Seth Asante presented the limits of the study corridor as the General Edwards Bridge to the Nahant Rotary including Broad Street and Washington Street. Seth Asante provided an overview of each of the tasks that will be performed in this study, which are described below:

- Collect data: The data to be collected include traffic volumes, pedestrian and bicyclist volumes, vehicle speeds, crashes, traffic signal timings and sequence, and transit service data. MassDOT Highway Division will collect all the traffic volume and speed data. DCR will provide the signal timings and intersection layout information. The Massachusetts Bay Transportation Authority will provide transit service data.
- Existing conditions analyses: the analyses would include inventory of the corridor land uses, pedestrians and bicyclists needs, safety conditions (crashes involving vehicles, pedestrians and bicyclists), traffic signal equipment essentials, peak hour traffic operations analyses, and spot speed survey.
- Forecast future traffic: Use the regional travel demand model set to forecast 2040 traffic. The model was calibrated for 101 cities and towns in the Boston Region MPO area and adopted for the Long-Range Transportation Plan.
- Develop and analyze alternatives: Work in conjunction with the study task force to develop as many as 3 alternatives including road diet concepts (reconfiguring roadway to improve safety and operations), complete street concepts (safe, convenient, and comfortable access for all users), and traffic circulation (efficient traffic operations)
- Document study: Present products of the tasks to the study task force for comments and feedback. Prepare draft document for review and finalize report

Seth Asante said the study is expected to be completed in 12 month.

## **Comments and Feedback**

Jamie Marsh, Director of Community Planning, distributed copies of the Lynn Waterfront Masterplan, which documents the vision and plans for the waterfront. Jamie Marsh said that he likes the scope of the study and it aligns with the vision for the Waterfront. Michael Clark of MassDOT OTP said that the existing land use needs to be changed to be compatible with improvements that would make the Lynnway and Carroll Parkway pedestrian-and-bicyclist friendly.

CTPS thanked the study advisory members' participations and welcomed any suggestions or comments after the meeting via e-mails or phone calls.

**Meeting was adjourned at 11:00 A.M.**

Attachments

SA/sa

**Route 1A/Lynnway/Carroll Parkway Priority Corridor Study**  
**Initial Scoping Meeting**  
**City of Lynn**  
**Room 302**

April 17, 2015

Name	Affiliation	Email
MARIE ABBOTT	CTPS	marieabbott@ctps.org
SARA TIMONER	MASSDOT D4 TRAFFIC	sara.timoner@state.ma.us
Michael Clark	MassDot Planning	Michael.Clark@ <del>state.ma.us</del> .ma.us
James Marsh	City of Lynn	Jmarsh@Lynnma.gov
Tim Cowdell	EDIC/Lynn	TCowdell@EDICLynn.org
Seth Asante	CTPS	SethAsante@ctps.org

**Presentation and Discussion of Existing Conditions and Alternatives**  
**Meeting Summary**  
**Route 1A/Lynnway/Carroll Parkway Study in Lynn**  
**City Hall, Room 302**  
**October 15, 2015**

**Meeting started at 10:20 A.M.**

Participants from Lynn, Department of Conservation and Recreation (DCR), MassDOT Office of Transportation Planning (OTP), MassDOT Highway Division's District 4 Office, Senator McGee's Office, Metropolitan Planning Area Council, and Central Transportation Planning Staff (CTPS) introduced themselves (see attached meeting roster).

**Existing Conditions**

Seth Asante of CTPS introduced the study background. He said that the following tasks have been completed: data collection, existing conditions analyses, and forecast of future traffic volumes. He went on to present the existing conditions summarized below:

- The Lynnway carries about 42,000 vehicles daily on a weekday; the Carroll Parkway carries about 33,000 vehicles daily; and Broad Street/Route 1A carries about 16,000 vehicles daily.
- The turning movement volumes at the intersection indicate that the majority of the traffic (80 percent) on the Lynnway and Carroll Parkway during peak periods is passing through the corridor (with destinations outside of the study area).
- The peak period in each direction of the roadway lasts for about 2 hours, with the morning peak traffic heading southbound and afternoon peak traffic northbound.
- The Lynnway and Carroll Parkway experience moderate pedestrian and bicycle volumes, even with the obstacles and unfriendly pedestrian and bicyclist setting.
- The crosswalks are too long (as long as 100 feet); no median refuge area for pedestrians; obstructions in some of the crosswalks; and no sidewalks at certain locations with strong pedestrian desire lines.
- Lack of shoulders and accommodations for bicyclists' present safety problems, which forces bicyclists to ride on the sidewalks. Lack of detection for bicycles at the signalized intersections.
- Curb cuts and ramps lack detection-warning plates and are not compliant with Americans with Disabilities Act (ADA), which poses problems for people with disabilities.
- Outdated signal-timing plan needs to be updated to make traffic flow efficient.
- Substandard signal equipment: needs signal heads lack back plates, which allow for improved visibility.

- Signal controllers may need upgrades to be adaptive, or responsive complex timing plans, or changing traffic flow patterns.
- Lack of Opticom system to handle emergency vehicle preemption and lack of transit signal priority to improve on-time performance for buses.
- Turn prohibitions at some intersections lead to circuitous circulation and U-turns, such as at Blossom Street, which forces drivers to proceed to Shepard Street/Marine Boulevard intersection or Kingman Street intersection to turn left; this affects riders of the Lynn Ferry boat service.
- High volume of traffic turning left from the Lynnway creates queue storage problems on northbound Market Street for the high volume traffic turning right onto Broad Street.
- On the Lynnway and Carroll Parkway, there were 240 crashes involving 453 vehicles; 61 nonfatal injury crashes (84 persons); and 2 fatal injury crashes (2 persons).
- On Broad Street/Route 1A, there were 166 crashes involving 331 vehicles; 28 nonfatal injury crashes (32 persons); and 1 fatal injury crash (1 person).

### **Future Traffic Forecast**

Seth Asante provided an overview of the 2040 traffic projections. The Lynnway and Carroll Parkway would grow by the following rates between 2015 and 2040:

- Total daily traffic – four percent
- AM peak-period traffic – two percent
- PM peak-period traffic – two percent
- Midday 9:00 AM-3:00 PM – five percent
- Night time (6:00 PM-6:00 AM) – five percent

### **Improvement Alternatives**

Seth Asante said that CTPS staff will work with the task force to develop short- and long-term strategies to address safety, operations, and multimodal transportation problems, which were identified in the corridor. Seth Asante presented one short-term alternative and three long-term for feedback.

- The short-term improvements maintain the existing roadway cross-section and makes improvements to address some of the pedestrian and bicycle safety issues and make traffic flow more efficient.
- Because Lynn is planning to change the land uses and redevelop the Waterfront area, the strategy for the long-term improvements for Lynnway and Carroll Parkway was to evaluate different roadway cross-sections to improve safety, operations, and access for all users, and to make it more accommodating for pedestrians and bicyclists.

- The long-term improvements include road-diet, complete streets, changes in traffic circulating patterns, and transit priority lanes.
- Some of the alternatives have improvements that are mostly within the existing roadway's right-of-way and take into account the needs of abutters and users, such as Alternatives 1 and 2. Other alternatives have improvements that would require more space to build such as Alternatives 3 and 4. In addition, Alternatives 2, 3, 4 would need land use changes at the Waterfront area to make them successful—for example, land uses that attract pedestrians and bicyclists, such as recreation areas, parks, residential developments, and other mixed land uses.

## **Comments and Feedback**

There was a discussion on adding pedestrian bridges to the Lynnway. The task force talked about some of the benefits of pedestrian bridges such as making it easier and safer to connect the Waterfront to West Lynn and Lynn downtown. The task force also discussed the disadvantages of pedestrian bridges such as long and complex ramps and fencing to prevent pedestrians from crossing at-grade at locations where drivers are not expecting pedestrians. Jamie Marsh, Director of Community Planning, said that CTPS should consider a pedestrian-friendly boulevard such as Commonwealth Avenue and Rose Kennedy Greenway in Boston as one of the alternatives. Michael Clark of MassDOT OTP said the study should take into consideration state policies such as MassDOT Healthy Transportation Compact and Complete Streets. Seth Asante informed the task force that he will add two more alternatives: one with boulevard-style roadway and one with pedestrian bridges on the Lynnway.

Seth Asante thanked the study advisory members for their participation in the study and welcomed any suggestions or comments after the meeting via e-mails or phone calls.

**Meeting was adjourned at 12:00 PM.**

Attachments

SA/sa

Route 1A/Lynnway/Carroll Parkway Priority Corridor Study  
City of Lynn  
Room 302

October 15, 2015

Name	Affiliation
✓ Jamie Cerulli	Mayor Kennedy's Office (May Fountain)
✓ James Marsh	Community Development Department, Lynn
✓ James Cowdell (EDIC)	Lynn Economic Development and Industrial Corporation (Bill Dechuk)
Patrice Kish	Department of Conservation and Recreation
Sean Pierce	Department of Conservation and Recreation
Ken Kirwin	Department of Conservation and Recreation
✓ Val Soroka (state. resources)	Department of Conservation and Recreation
Connie Raphael	MassDOT Highway Division District 4
✓ Sara Timoner	MassDOT Highway Division District 4
Ethan Britland	MassDOT Office of Transportation Planning
✓ Michael Clark	MassDOT Office of Transportation Planning
Eric Bourassa	Metropolitan Area Planning Council
✓ Sara Kurpiel Lee	Metropolitan Area Planning Council
✓ Sheri Warrington	Office of Senator McGee
Meagan Hamil	Office of Senator McGee
Donald H. Wong	State Representative
Lori A. Ehrlich	State Representative
Joseph Gravellese	Office of Representative Lori A. Ehrlich
Robert F. Fennell	State Representative
Brendan P. Crighton	State Representative
✓ ANDREW HALL	LYNN DPW ahall@lynnmass.gov



## **Review Comments**

## Seth Asante

---

**From:** Clark, Michael (DOT)  
**Sent:** Thursday, May 19, 2016 4:44 PM  
**To:** Seth Asante  
**Cc:** Pounds, Bryan (DOT)  
**Subject:** RE: CTPS Lynnway study

Hi Seth,

Thank you for the opportunity to review the revised report, as well as for your hard work on this study.

We request that for Alternative 4 (Pedestrian Bridge), under disadvantages, that the language requiring ramps to be ADA-accessible may also require real estate takings to accommodate this infrastructure. We would also note that the addition of fencing to the roadway would reduce access for all motorists and bicyclists, in addition to pedestrians, and may not be feasible with the number of curb cuts present.

We also request that Table 7 on p. 55 include some type of indicator, such as an asterisk, for the associated construction costs for those alternatives which require an expansion of the ROW, as land takings will add to the total cost but are not accounted for in the study.

Thanks,  
Michael

-----Original Message-----

From: Seth Asante [<mailto:sasante@ctps.org>]  
Sent: Monday, May 16, 2016 10:12 AM  
To: Clark, Michael (DOT)  
Subject: FW: CTPS Lynnway study

Hi Michael,

I am preparing the final draft of the Lynnway study, so please send me your comments on the updated version by Friday, May 20.

Thank you,  
Seth

-----Original Message-----

From: Seth Asante [<mailto:sasante@ctps.org>]  
Sent: Wednesday, May 04, 2016 10:14 AM  
To: 'Clark, Michael (DOT)'  
Subject: RE: CTPS Lynnway study

Did you receive the documents I sent to you?

-----Original Message-----

From: Clark, Michael (DOT) [<mailto:michael.clark@state.ma.us>]  
Sent: Wednesday, May 04, 2016 9:20 AM  
To: Seth Asante

Subject: CTPS Lynnway study

Hi Seth,

You mentioned a few weeks ago that your team would have an updated version of the Lynnway study in advance of tomorrow's LEAD meeting. Could you send that along to us? I plan on attending tomorrow morning.

Thanks,  
Michael

Michael Clark  
Corridor Planning Unit - Office of Transportation Planning Massachusetts Department of Transportation  
10 Park Plaza, Suite #4150, Boston, MA 02116  
Phone: 857-368-8867  
Email: [Michael.Clark@state.ma.us](mailto:Michael.Clark@state.ma.us)



Lynn City Hall  
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Lynn, MA 01901  
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Judith Flanagan Kennedy  
*Mayor*

James M. Cowdell  
*Executive Director*

Charles J. Gaeta  
*Chairman*

EDIC/Lynn  
Economic  
Development  
& Industrial  
Corporation of Lynn

LMFC  
Lynn Municipal Finance  
Corporation

May 5, 2016

To Whom It May Concern,

I am writing with comments regarding the recent Route 1A/Lynnway/Carroll Parkway Study of Lynn. This work was completed by the Boston Region Metropolitan Planning Organization.

The report concluded with six recommendations. I am writing to you with my feedback on these recommendations.

**Plan 1.** The recommendation of adding a signal light at the Blossom Street intersection is looked at favorably. This will make it easier for Commuter Ferry riders to be able to take a direct left hand turn onto Blossom Street Extension, as well as, allow for pedestrian access.

**Plan 2.** It is not feasible to remove two lanes of heavily traversed roadway to make two bicycle lanes. This would have a negative impact on traffic and future development in this area.

**Plan 3.** Same opinion as Plan 2.

**Plan 4.** The idea of constructing pedestrian bridges is sound and will assist in connecting Lynn's Waterfront to the rest of the City.

**Plan 5.** This was originally proposed in the Sasaki Master Waterfront Plan. This was not well received at that time by a variety of stakeholders. I believe this rerouting would cause many disruptions that make this plan not viable.

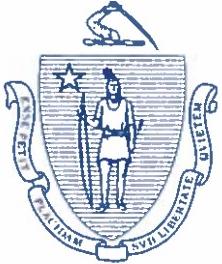
**Plan 6.** I am opposed to this plan as a viable option.

To summarize, I support the additional light and direct turn into Blossom Street as well as the creation of pedestrian bridges.

Sincerely,

A handwritten signature in blue ink, appearing to read "James M. Cowdell".

James M. Cowdell, MBA  
Executive Director  
EDIC



The Commonwealth of Massachusetts  
MASSACHUSETTS SENATE

SENATOR THOMAS M. McGEE

Third Essex District

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Chairman  
JOINT COMMITTEE ON TRANSPORTATION

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CLIMATE CHANGE

ECONOMIC DEVELOPMENT AND  
EMERGING TECHNOLOGIES

ENVIRONMENT, NATURAL RESOURCES  
AND AGRICULTURE

February 16, 2016

Seth Asante, Boston MPO Staff  
State Transportation Building  
Ten Park Plaza, Suite 2150  
Boston, MA 02116-3968

Dear Mr. Asante:

Thank you for the opportunity to comment on the Boston Metropolitan Planning Organization's Route 1A/Lynnway/Carroll Parkway Study in Lynn. This corridor is a vital route in and out of the Gateway City of Lynn and, as acknowledged by the Boston MPO in initiating this study, is in critical need of improvements for enhancing public safety, reducing road congestion and connecting the waterfront to the downtown and surrounding neighborhoods. I commend the MPO staff for their efforts to work with the City to conduct the study. Any of the alternatives presented would certainly represent an improvement; however, I suggest that the implementation of any changes must be undertaken in the context of many other exciting developments underway for revitalization in the City of Lynn.

One of the four stated objectives of the study is "Supporting Lynn's vision for the Waterfront". Yet, I am concerned that there are no specific issues mentioned with regard to improved bike, pedestrian and vehicle connections from the downtown to the Commuter Ferry Terminal on Blossom Street. In the section that describes the Blossom Street Intersection, the Ferry terminal is not even listed as a land use for that roadway, when in fact, access to the waterfront at that intersection is a primary reason for the City seeking improvements across Route 1A. In the description of transit services on the corridor, on page 12 of the Technical Memorandum, there is a brief explanation of the ferry service, but no details on the public safety challenges for drivers, pedestrians and cyclists to access the terminal under current conditions. I would request that any alternative pursued by the Boston MPO include a detailed plan for accessing the Blossom Street Ferry for drivers, cyclists and pedestrians.

Addressing the long or absent crosswalks, non-compliant curb cuts, signal timing, and lack of bicycle accommodations, would undoubtedly enhance the utilization of the parkway for all, and would improve access between the waterfront and downtown to spur economic growth and neighborhood connections. With expansion of the North Shore Community College campus underway, and efforts to redevelop some major parcels of land along Lynn's waterfront for both commercial and residential projects, I would challenge the Boston MPO to look beyond the traditional roadway improvements and adjustments. Instead, I urge you to consider a more visionary approach to connecting the waterfront with the downtown and surrounding neighborhoods, to meet the needs of the residents and businesses who will rely on this roadway in years to come. Greenville, South Carolina is an excellent example of a transformative pedestrian connection for a once blighted downtown area that has undergone a major revitalization.

Before selecting a preferred alternative for improvements on this corridor, I would also like to invite members of the Boston MPO to attend a Lynn Economic Advancement and Development (LEAD) team meeting to better understand the efforts of federal, state and local officials in coordinating all facets of development, revitalization and transportation improvements for Lynn and residents of the North Shore. I sincerely hope that a joint effort by the Boston MPO, the Department of Conservation and Recreation, and the LEAD Team members, will result in both short- and long-term improvements to this corridor.

Again, thank you for the opportunity to comment on the study. Please do not hesitate to contact me directly should you have any questions. Please contact Meaghan Hamill, my Chief of Staff, to coordinate a meeting between the LEAD Team and staff and/or members of the Boston MPO.

Sincerely,



Thomas M. McGee  
State Senator  
Third Essex District



## Office of Economic & Community Development City of Lynn, Massachusetts

3 City Hall Square - Room 311 - Lynn, MA 01901

James M. Marsh  
Director

March 10, 2016

Judith Flanagan Kennedy  
Mayor

Seth Asante  
State Transportation Building  
Ten Park Plaza, Suite 2150  
Boston, MA 02116-3968

Dear Mr. Asante:

Over the past ten years, during some of the most trying economic times, the City of Lynn has made major progress completing the necessary physical and legal changes to develop 305 acres of the most underutilized waterfront land along the entire U.S. Eastern Seaboard.

Specifically, in June of 2006, the City partnered with Sasaki Associates, one of the leading architectural and design firms in the world, and implemented a comprehensive Waterfront Master Plan and Municipal Harbor Plan that will guide development on these waterfront parcels. These plans detail the potential for over 4 million square feet of residential development and close to 2 million square feet of commercial/retail, hotel, office and light industrial space. They also include 45 acres for a port designated area, a boardwalk, marinas and ample open public space. A fully implemented plan and built out waterfront would provide almost 10,000 construction jobs, 5,000 permanent jobs and an estimated \$18 million in annual property tax revenue.

In conjunction with these plans, the City of Lynn implemented a comprehensive set of turnkey zoning regulations for this area. This action transformed our waterfront plans into easily understandable city ordinances, streamlining the permitting process by which development can occur.

The City, through the Economic Development Industrial Corporation (EDIC) finished and implemented a MBTA ferry terminal / ferry service designed to supplement the existing MBTA commuter rail and bus service within 100 yards of the waterfront. The area has also been classified a Commonwealth of Massachusetts Growth District, an important designation for older urban cities in need of increased tax bases and commercial and residential development.

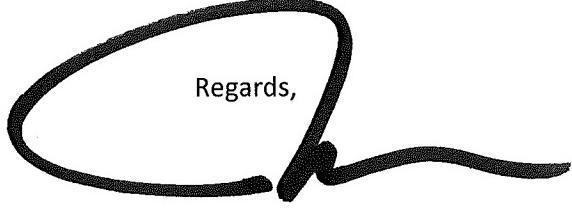
Perhaps one of the most important accomplishments to date, the City partnered with National Grid, General Electric, and a host of private entities to relocate two large 115 kV power lines that have been inhibiting waterfront development for over 40 years. Together, these actions have resulted in the sale of two major parcels of land. Specifically, the so-called Beacon Chevrolet site and the GE Gear plant are under agreement and are now primed for development.

In tandem with the redevelopment of these and many other parcels of land, the next major step essential to full implementation of our vision, is the creation of public access, transforming the waterfront into a vibrant destination point with direct linkage to Lynn's downtown and surrounding neighborhoods. Much like the power lines inhibited development, the current configuration and size of the Lynnway inhibits access to the waterfront. All along this stretch of roadway four to six lanes of traffic act as a barrier, cutting off the waterfront from our residents and tourists.

With all this in mind, I urge you to continue to be forward thinking in the creation of this plan/study. Please balance the needs of vehicular commuters with the need for pedestrian access the waterfront. Bear in mind the proposed future use of the GE commuter rail stop and how waterside residents could only utilize this stop with access across the Lynnway. Much like Storrow Drive and the Charles, envision a boardwalk along the full length of our waterfront and how access is essential to its full use. Create this plan knowing that small retail businesses will continue to sprout up on the waterside of the Lynnway and that access will be essential to their sustainability. Remember that the Ferry is utilized by thousands and could be utilized by thousands more if access was more readily available via bicyclists or pedestrians. Lastly, the need for safe havens in addition to overpasses is essential to the safety of those crossing the Lynnway.

In all, we believe that access to the waterfront from our neighborhoods and downtown is a vital lynchpin to the future of the City. Please ensue the study and its alternatives are forward thinking, bearing in mind the development and use changes that will occur in the very near future.

Thank you for your time in creating this study.



Regards,

James M. Marsh

## Seth Asante

---

**From:** Clark, Michael (DOT)  
**Sent:** Monday, February 01, 2016 4:00 PM  
**To:** Seth Asante  
**Cc:** Pounds, Bryan (DOT)  
**Subject:** RE: Route 1A/Lynnway/Carroll Parkway Study in Lynn

Hi Seth,

OTP has the following comments on the Lynnway study.

### **General Comments**

- In need of a proofread for misspelling and incorrect grammar
- Section 2.3 needs citations to the Lynn Waterfront Masterplan (Master Plan?)
- On p. 4 the Lynnway is reflected as connecting to Saugus, Revere, and Everett to the south. Revere, Boston, Chelsea, and Everett sounds more accurate.
- Section 4.4, Bicycle Traffic Volumes, should expand on the unfriendly nature of the roadway discouraging bicycle activity. No mention of high-speed nature of traffic or high number of heavy vehicles.
- Section 4.8 – map of transit services needed. Recommend bringing in characteristics like hourly range of services and peak frequency from the appendix into the body of report for informational purposes.
- On p. 12 is the utilization rate of CR parking very low according to an MBTA standard?
- Section 6 – no mention that all LOS falls at D or better and is therefore considered acceptable. It's fine to point out problem areas but none of the intersections are considered to be failing, which should be emphasized.
- Only one mention of ADA non-compliance in identified problems (p. 17-19). Could use a general mention of the non-compliant nature of most of the pedestrian and bicyclist issues.
- As with Section 4.4 comment point out why the roadway would be considered unfriendly for pedestrians and bicyclists (last bike/ped bullet on p. 18) (high speeds, heavy truck traffic, etc.)

### **Improvement Alternatives and Recommendations**

- Where possible please provide pictures of what different alternatives or components of different alternatives would look like
- In general, there should be a clearer distinction between the alternatives and what the scopes are that is driving the cost differentials. For instance, the differences between Alternatives 1 and 2 are not spelled out enough in the report. There is an additional signal, yes, but what else? Rehaul of the median space? A full depth reconstruction instead of a milling/overlay? Could it be that Alternative 1 should cost more for things like repairing the broken sidewalks along the length of the ~2 mile corridor? What exactly does 1 not do that 2 does that would be problematic from a long-term perspective?
- Consider adding language to Alternative 2 which promotes a DCR-like aesthetic. Almost like the Carroll Parkway portion of the corridor, or something like VFW in West Roxbury. Beautification of the corridor, with bike/ped/transit amenities, easier pedestrian movements across the road, and a welcoming sidewalk experience (to the extent possible, might not be enough space for tree plantings), which wouldn't be a Greenway-like transformation but will better support the type of high-rise, residential development the City wants out of the Waterfront.
- The impacts of Alternative 3 need to be hashed out much more strongly than they are. No need to put a specific cost to land takings but language needs to be devoted to what a heavy lift that would be from a cost and legal standpoint. It renders the \$20-25 million cost estimate to be quite unrealistic. Even excepting the takings a 50-100 foot median space would necessitate an entire roadway reconstruction. Access to side streets would also be impacted (e.g. multiple lanes at the Commercial Street intersection in current configuration – keeping that and pushing it back would require additional land takings, intersection reconstruction, potential impact to rail

- bridge). Discussion on connecting with the Nahant Roundabout is missing (would roundabout be reconstructed? Where would pedestrian trail in median go?)
- Ensure the Alternative 4 discussion emphasizes the loss of pedestrian access that comes with erecting fences, that it might assist safety but the idea as a whole reduces mobility and connectivity.
  - The concerns raised about Alternative 6, the BRT, can be addressed through the right service characteristics for the routes. This should be emphasized. If not done properly, yes, the space would be underutilized and the right buses need to be used. But this would be more of the MBTA's problem, not a problem with the design. It reads a bit like the idea has its problems when it's the execution of the service that would dictate whether it works or not. If frequent service at BRT standards is not going to be achieved then this alternative should not move forward (and this should be stated), but that's conditional and we don't think it's this study's purpose to judge whether that will happen or not. Although the Lynnway represents a small portion of the routes for the local bus services, future developments along the Lynnway would greatly benefit from a BRT service to connect with Wonderland. In that case the Lynnway is a decent stretch of the trip.

Let me know if you have any questions or want to talk further.

Thanks,  
Michael

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**From:** Seth Asante [mailto:sasante@ctps.org]

**Sent:** Thursday, January 21, 2016 3:03 PM

**To:** James Marsh; James Cowdell; Ken Kirwin (DCR); Kurpiel, Sarah; Bourassa, Eric; Clark, Michael (DOT); Raphael, Connie (DOT); Timoner, Sara (DOT); Sheri Warrington (SEN); Soroka, Val (DCR); Jamie Cerulli; Patrice Kish (DCR); Gravellese, Joseph (HOU); Hamill, Meaghan (SEN); Andrew Hall; Pounds, Bryan (DOT)

**Cc:** Mark Abbott

**Subject:** Route 1A/Lynnway/Carroll Parkway Study in Lynn

Good Afternoon:

I am pleased to inform you that the "Route 1A/Lynnway/Carroll Parkway Study in Lynn" is available for review and comment. The attached documents are the technical memorandum and appendices. The study was funded by the Boston Region Metropolitan Planning Organization (MPO) and conducted by the staff to the MPO—also known as the Central Transportation Planning Staff (CTPS). I would appreciate it if you could provide me with your comments by **February 4, 2016**.

MPO staff, working in conjunction with the study's advisory task force, identified, developed, and evaluated improvements for Lynnway and Carroll Parkway. The study provides City of Lynn, the Department of Conservation and Recreation, the Massachusetts Department of Transportation, and other stakeholders with an opportunity to begin researching the needs of the Lynnway and Carroll Parkway—in light of the City's vision for the Waterfront—and to start planning, design and engineering efforts. The study aligns with the MPO goals of modernizing roadways to reduce congestion, increasing safety on the region's highway system, expanding the quantity and quality of walking and bicycling, and making transit service more efficient and modern.

The focus of the study was to evaluate different roadway cross-sections to accommodate all road users safely and fulfill Lynn's vision for the Waterfront. As discussed in the memorandum, MPO staff developed six alternatives (one short-term and five long-term alternatives) for consideration. The improvements would increase traffic safety, make traffic operations more efficient, and modernize the roadway to accommodate all users, including bicyclists and pedestrians.

Please do not hesitate to call me at 857-702-3644 or send me email at [sasante@ctps.org](mailto:sasante@ctps.org) if you would like further information.

## Seth Asante

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**From:** Lee, Sarah Kurpiel  
**Sent:** Friday, February 12, 2016 2:39 PM  
**To:** 'Seth Asante'  
**Cc:** Bourassa, Eric  
**Subject:** RE: Route 1A/Lynnway/Carroll Parkway Study in Lynn

Hi Seth,

Thank you for your work on this report. Here are my comments:

- I don't think the Alternative 1 (short-term) recommendation is nearly strong enough, given that there are no facilities provided for cyclists. CTPS is recommending "further study" to see if sharrows are appropriate for the outside lanes. CTPS has determined there is a considerable amount of excess capacity, so the outside lanes should be removed to create a bicycle lane. DCR could do this in the short term with jersey barriers or flex posts and it wouldn't be very expensive.
- Figure for Alternative 1 should show physically separated bicycle lanes as discussed above.
- Mention the possibility of doing Alternative 1 as a month-long pilot in the Summer if DCR/Lynn is hesitant to remove the lane.
- The Level of Service forecasts for the alternatives are nearly all A's, B's, and C's. It seems like the vehicular mode is still being prioritized over others.
- It's hard to believe the alternative with pedestrian bridges (alternative 4) would be equal in cost to other alternatives? How could bridge costs not be considerably higher?
- Its unlikely that the preferred alternative (#3) will happen in the foreseeable future, due to the cost. Recommend alternative 1 as a "short-term" solution (only if above improvements are included) while funds are raised for the preferred alternative.
- Any mention of impact to the many business driveways along Rt 1?
- A big reason people don't want to walk along the Lynnway is the absence of trees and greenery. The road is ugly and uncomfortable. I'd like to see more focus on landscaping in these recommendations. Even with considerable roadway "improvements", without greenery it will not be an attractive place to walk/ride.
- Alternative 6 is listed in the text as \$15-20 million but shown in Table 7 as a "High" cost, which is given to the alternatives in the \$20-25million range. Please adjust price in text (if actually the \$20-25 range), or change "High" to "Moderate" in Table 2.

Please let me know if you have any questions on this. Thank you for the opportunity to comment.

Sarah

**Sarah Kurpiel Lee**  
TRANSPORTATION ENGINEER & PLANNER  
Metropolitan Area Planning Council  
(617) 933-0744

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**From:** Seth Asante [mailto:[sasante@ctps.org](mailto:sasante@ctps.org)]  
**Sent:** Thursday, January 21, 2016 3:03 PM  
**To:** James Marsh; James Cowdell; Ken Kirwin (DCR); Lee, Sarah Kurpiel; Bourassa, Eric; Clark, Michael (DOT); Connie Raphael (DOT); Sara Timoner (DOT); Sheri Warrington (SEN); Soroka, Val (DCR); Jamie Cerulli; Patrice Kish (DCR); Gravellese, Joseph (HOU); Hamill, Meaghan (SEN); Andrew Hall; Pounds, Bryan (DOT)  
**Cc:** Mark Abbott  
**Subject:** Route 1A/Lynnway/Carroll Parkway Study in Lynn

# **APPENDIX B**

## **Traffic Data**

## **Automatic Traffic Recorder Counts**

MassDOT Highway Division  
WEEKLY SUMMARY FOR LANE  
Starting: 6/1/2015

Page: 3

STA. 1 NB

Site Reference: 150140000402

Site ID: 110000000101

Location: RTE. 1A/LYNNWAY, SOUTH OF HANSON ST.

Direction: ROAD TOTAL

File: SPDC-101.prn

City: LYNN

County: SPEED LN-1&2 NB

TIME	MON 1	TUE 2	WED 3	THU 4	FRI	WKDAY AVG	SAT	SUN	WEEK AVG	TOTAL
01:00	242	257	255	312		266			266	1066
02:00	164	141	131	178		153			153	614
03:00	114	100	94	115		105			105	423
04:00	82	68	72	82		76			76	304
05:00	123	129	98	120		117			117	470
06:00	295	286	312	326		304			304	1219
07:00	622	570	638	637		616			616	2467
08:00	856	877	902	995		907			907	3630
09:00	868	931	938	912		912			912	3649
10:00	788	769	849	831		809			809	3237
11:00	881	863	912	960		904			904	3616
12:00	901	926	964	912		925			925	3703
13:00	937	965	1042	1108		1013			1013	4052
14:00	1099	1157	1073	1155		1121			1121	4484
15:00	1222	1205	1260	1303		1247			1247	4990
16:00	1573	1612	1663	1667		1628			1628	6515
17:00	1720	1761	1805	1633		1729			1729	6919
18:00	1675	1985	2052			1904			1904	5712
19:00	1784	1897	1878			1853			1853	5559
20:00	1399	1264	1445			1369			1369	4108
21:00	811	895	1023			909			909	2729
22:00	672	776	947			798			798	2395
23:00	499	661	709			623			623	1869
24:00	380	432	520			444			444	1332
TOTALS	19707	20527	21582	13246	0	20732	0	0	20732	75062
% AVG WKDY	95	99	104	63.8						
% AVG WEEK	95	99	104	63.8						
AM Times	12:00	09:00	12:00	08:00		12:00			12:00	
AM Peaks	901	931	964	995		925			925	
PM Times	19:00	18:00	18:00	16:00		18:00			18:00	
PM Peaks	1784	1985	2052	1667		1904			1904	
D%	55	55	55	55						
K%	9	10	10	13						

v12

NB 20732  
SB 20708  
Comb AWD 41440  
FAC .91  
Comb ADT 37,700

MassDOT Highway Division  
 WEEKLY SUMMARY FOR LANE  
 Starting: 6/1/2015

Page: 3

STA. 1 SB

Site Reference: 150140000766

Site ID: 110000000102

Location: RTE. 1A/LYNNWAY, SOUTH OF HANSON ST.

Direction: ROAD TOTAL

File: SPDC-102.prn

City: LYNN

County: SPEED LN-1&2 SB

TIME	MON 1	TUE 2	WED 3	THU 4	FRI	WKDAY AVG	SAT	SUN	WEEK AVG	TOTAL
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01:00	152	119	129	152		138			138	552
02:00	122	90	93	92		99			99	397
03:00	89	80	98	102		92			92	369
04:00	132	143	121	113		127			127	509
05:00	292	303	283	313		297			297	1191
06:00	907	928	897	881		903			903	3613
07:00	1830	1918	1692	1626		1766			1766	7066
08:00	1932	1955	1810	1895		1898			1898	7592
09:00	1758	1892	1644	1618		1728			1728	6912
10:00	1191	1337	1228	1348		1276			1276	5104
11:00	1048	1017	1082	1082		1057			1057	4229
12:00	1053	1074	1142	1120		1097			1097	4389
13:00	1059	1080	1079	1113		1082			1082	4331
14:00	1054	1060	1071	1125		1077			1077	4310
15:00	1085	1039	1074	1159		1089			1089	4357
16:00	1075	1035	1101	1189		1100			1100	4400
17:00	1054	1060	1171	1225		1127			1127	4510
18:00	1080	1113	1178	1188		1139			1139	4559
19:00	795	903	954			884			884	2652
20:00	727	765	840			777			777	2332
21:00	660	649	759			689			689	2068
22:00	543	572	692			602			602	1807
23:00	393	421	477			430			430	1291
24:00	229	222	253			234			234	704

TOTALS	20260	20775	20868	17341	0	20708	0	0	20708	79244
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% AVG WKDY	97.8	100.3	100.7	83.7						
% AVG WEEK	97.8	100.3	100.7	83.7						

AM Times	08:00	08:00	08:00	08:00		08:00			08:00	
AM Peaks	1932	1955	1810	1895		1898			1898	

PM Times	15:00	18:00	18:00	17:00		18:00			18:00	
PM Peaks	1085	1113	1178	1225		1139			1139	

D%	50	50	50	50						
K%	10	9	9	11						

MassDOT Highway Division  
 WEEKLY SUMMARY FOR LANE 1  
 Starting: 6/1/2015

Page: 1

STA. 2 NB

Site Reference: 150140000444

Site ID: 000000000201

Location: RTE. 1A/LYNNWAY, NORTH OF COMMERCIAL ST.

Direction: NORTH

File: 201.prn

City: LYNN

County: VOL NB

TIME	MON 1	TUE 2	WED 3	THU	FRI	WKDAY AVG	SAT	SUN	WEEK AVG	TOTAL
01:00	228	250	234			237			237	712
02:00	159	156	128			147			147	443
03:00	120	103	90			104			104	313
04:00	104	105	103			104			104	312
05:00	182	183	148			171			171	513
06:00	296	345	289			310			310	930
07:00	578	579	561			572			572	1718
08:00	908	953	954			938			938	2815
09:00	996	1082	1042			1040			1040	3120
10:00	861	931	927			906			906	2719
11:00	932	942	929			934			934	2803
12:00	961	966	1017			981			981	2944
13:00	1047	1069	1137			1084			1084	3253
14:00	1126	1225	1169			1173			1173	3520
15:00	1290	1351	1366			1335			1335	4007
16:00	1741	1769	1762			1757			1757	5272
17:00	1968	1959	2050			1992			1992	5977
18:00	2189	2303				2246			2246	4492
19:00	2062	2043				2052			2052	4105
20:00	1402	1340				1371			1371	2742
21:00	811	882				846			846	1693
22:00	657	730				693			693	1387
23:00	476	606				541			541	1082
24:00	366	421				393			393	787
TOTALS	21460	22293	13906	0	0	21927	0	0	21927	57659
% AVG WKDY	97.8	101.6	63.4							
% AVG WEEK	97.8	101.6	63.4							
AM Times	09:00	09:00	09:00			09:00			09:00	
AM Peaks	996	1082	1042			1040			1040	
PM Times	18:00	18:00	17:00			18:00			18:00	
PM Peaks	2189	2303	2050			2246			2246	

MassDOT Highway Division  
WEEKLY SUMMARY FOR LANE  
Starting: 6/1/2015

Page: 3

*STA. 3 TOTAL*

Site Reference: 150140000595

Site ID: 000000000301

Location: RTE. 1A/LYNNWAY, BTWN NEWELL&WASHINGTON

Direction: ROAD TOTAL

File: 30102.prn

City: LYNN

County: VOL N&S

TIME	MON 1	TUE 2	WED 3	THU 4	FRI	WKDAY AVG	SAT	SUN	WEEK AVG	TOTAL
01:00	201	190	213	247		212			212	851
02:00	140	125	132	145		135			135	542
03:00	80	72	94	87		83			83	333
04:00	101	91	106	103		100			100	401
05:00	268	222	254	264		252			252	1008
06:00	866	891	865	832		863			863	3454
07:00	1930	1972	1977	2040		1979			1979	7919
08:00	2401	2402	2561	2560		2481			2481	9924
09:00	2164	2218	2159	2354		2223			2223	8895
10:00	1622	1663	1740	1761		1696			1696	6786
11:00	1438	1438	1544	1632		1513			1513	6052
12:00	1477	1522	1532	1595		1531			1531	6126
13:00	1537	1603	1635	1788		1640			1640	6563
14:00	1616	1639	1729	1880		1716			1716	6864
15:00	1774	1905	1944	2021		1911			1911	7644
16:00	2075	2094	2238	2310		2179			2179	8717
17:00	2225	2247	2418	2394		2321			2321	9284
18:00	2363	2393	2433	2579		2442			2442	9768
19:00	2168	2158	2134			2153			2153	6460
20:00	1529	1544	1662			1578			1578	4735
21:00	998	1106	1342			1148			1148	3446
22:00	845	914	1115			958			958	2874
23:00	555	694	807			685			685	2056
24:00	354	435	488			425			425	1277
TOTALS	30727	31538	33122	26592	0	32224	0	0	32224	121979
% AVG WKDY	95.3	97.8	102.7	82.5						
% AVG WEEK	95.3	97.8	102.7	82.5						
AM Times	08:00	08:00	08:00	08:00		08:00			08:00	
AM Peaks	2401	2402	2561	2560		2481			2481	
PM Times	18:00	18:00	18:00	18:00		18:00			18:00	
PM Peaks	2363	2393	2433	2579		2442			2442	
D%	75	75	75	65						
K%	8	8	8	10						

u2

Comb AWD 32224

FAC ,91

Comb ADT 29,300

MassDOT Highway Division  
 WEEKLY SUMMARY FOR LANE 1  
 Starting: 6/1/2015

Page: 1

STA. 3 NB

Site Reference: 150140000595

File: 30102.prn

Site ID: 000000000301

City: LYNN

Location: RTE. 1A/LYNNWAY, BTWN NEWELL&WASHINGTON

County: VOL N&S

Direction: NORTH

TIME	MON 1	TUE 2	WED 3	THU 4	FRI	WKDAY AVG	SAT	SUN	WEEK AVG	TOTAL
01:00	138	139	149	177		150			150	603
02:00	95	88	94	107		96			96	384
03:00	48	43	47	43		45			45	181
04:00	40	31	46	38		38			38	155
05:00	64	50	63	65		60			60	242
06:00	153	162	157	163		158			158	635
07:00	332	338	334	391		348			348	1395
08:00	615	646	697	709		666			666	2667
09:00	628	599	633	744		651			651	2604
10:00	544	533	608	594		569			569	2279
11:00	544	598	652	706		625			625	2500
12:00	660	687	713	716		694			694	2776
13:00	718	761	806	898		795			795	3183
14:00	828	839	873	957		874			874	3497
15:00	949	1048	1096	1068		1040			1040	4161
16:00	1264	1295	1353	1359		1317			1317	5271
17:00	1478	1466	1548	1484		1494			1494	5976
18:00	1638	1669	1631	1732		1667			1667	6670
19:00	1604	1567	1502			1557			1557	4673
20:00	1112	1067	1123			1100			1100	3302
21:00	630	734	859			741			741	2223
22:00	545	576	704			608			608	1825
23:00	351	465	533			449			449	1349
24:00	230	294	342			288			288	866
TOTALS	15208	15695	16563	11951	0	16030	0	0	16030	59417
% AVG WKDY	94.8	97.9	103.3	74.5						
% AVG WEEK	94.8	97.9	103.3	74.5						
AM Times	12:00	12:00	12:00	09:00		12:00			12:00	
AM Peaks	660	687	713	744		694			694	
PM Times	18:00	18:00	18:00	18:00		18:00			18:00	
PM Peaks	1638	1669	1631	1732		1667			1667	

MassDOT Highway Division  
 WEEKLY SUMMARY FOR LANE 2  
 Starting: 6/1/2015

Page: 2

STA . 35B

Site Reference: 150140000595

Site ID: 000000000301

Location: RTE. 1A/LYNNWAY, BTWN NEWELL&WASHINGTON

Direction: SOUTH

File: 30102.prn

City: LYNN

County: VOL N&S

TIME	MON 1	TUE 2	WED 3	THU 4	FRI	WKDAY AVG	SAT	SUN	WEEK AVG	TOTAL
01:00	63	51	64	70		62			62	248
02:00	45	37	38	38		39			39	158
03:00	32	29	47	44		38			38	152
04:00	61	60	60	65		61			61	246
05:00	204	172	191	199		191			191	766
06:00	713	729	708	669		704			704	2819
07:00	1598	1634	1643	1649		1631			1631	6524
08:00	1786	1756	1864	1851		1814			1814	7257
09:00	1536	1619	1526	1610		1572			1572	6291
10:00	1078	1130	1132	1167		1126			1126	4507
11:00	894	840	892	926		888			888	3552
12:00	817	835	819	879		837			837	3350
13:00	819	842	829	890		845			845	3380
14:00	788	800	856	923		841			841	3367
15:00	825	857	848	953		870			870	3483
16:00	811	799	885	951		861			861	3446
17:00	747	781	870	910		827			827	3308
18:00	725	724	802	847		774			774	3098
19:00	564	591	632			595			595	1787
20:00	417	477	539			477			477	1433
21:00	368	372	483			407			407	1223
22:00	300	338	411			349			349	1049
23:00	204	229	274			235			235	707
24:00	124	141	146			137			137	411
TOTALS	15519	15843	16559	14641	0	16181	0	0	16181	62562
% AVG WKDY	95.9	97.9	102.3	90.4						
% AVG WEEK	95.9	97.9	102.3	90.4						
AM Times	08:00	08:00	08:00	08:00		08:00			08:00	
AM Peaks	1786	1756	1864	1851		1814			1814	
PM Times	15:00	15:00	16:00	15:00		15:00			15:00	
PM Peaks	825	857	885	953		870			870	

MassDOT Highway Division  
WEEKLY SUMMARY FOR LANE  
Starting: 6/1/2015

Page: 3

*STA 4 TOTAL*

Site Reference: 150140000513  
Site ID: 000000000401  
Location: NAHANT RD., SOUTH OF NAHANT ROTARY  
Direction: ROAD TOTAL

File: 40102.prn  
City: LYNN  
County: VOL N&S

TIME	MON 1	TUE 2	WED 3	THU 4	FRI	WKDAY AVG	SAT	SUN	WEEK AVG	TOTAL
01:00	46	37	65	45		48			48	193
02:00	38	37	36	25		34			34	136
03:00	11	9	12	18		12			12	50
04:00	19	19	24	26		22			22	88
05:00	48	40	68	48		51			51	204
06:00	156	210	200	203		192			192	769
07:00	414	411	420	502		436			436	1747
08:00	643	648	738	785		703			703	2814
09:00	616	595	612	645		617			617	2468
10:00	535	513	586	615		562			562	2249
11:00	504	505	645	578		558			558	2232
12:00	580	596	591	581		587			587	2348
13:00	552	602	646	660		615			615	2460
14:00	611	653	655	731		662			662	2650
15:00	628	682	695	743		687			687	2748
16:00	658	760	735	862		753			753	3015
17:00	655	685	849	922		777			777	3111
18:00	714	680	892	906		798			798	3192
19:00	630	675	756			687			687	2061
20:00	429	497	663			529			529	1589
21:00	352	364	517			411			411	1233
22:00	216	283	373			290			290	872
23:00	139	183	239			187			187	561
24:00	99	108	138			115			115	345
TOTALS	9293	9792	11155	8895	0	10333	0	0	10333	39135
% AVG WKDY	89.9	94.7	107.9	86						
% AVG WEEK	89.9	94.7	107.9	86						
AM Times	08:00	08:00	08:00	08:00		08:00			08:00	
AM Peaks	643	648	738	785		703			703	
PM Times	18:00	16:00	18:00	17:00		18:00			18:00	
PM Peaks	714	760	892	922		798			798	
D%	65	55	65	55						
K%	8	8	8	10						

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COMB AWD 10333

FAC .87 (.97)

COMB ADT 8,700

MassDOT Highway Division  
 WEEKLY SUMMARY FOR LANE 1  
 Starting: 6/1/2015

Page: 1

STA .4 NB

Site Reference: 150140000513  
 Site ID: 000000000401  
 Location: NAHANT RD., SOUTH OF NAHANT ROTARY  
 Direction: NORTH

File: 40102.prn  
 City: LYNN  
 County: VOL N&S

TIME	MON 1	TUE 2	WED 3	THU 4	FRI	WKDAY AVG	SAT	SUN	WEEK AVG	TOTAL
01:00	16	10	23	14		15			15	63
02:00	16	14	11	6		11			11	47
03:00	5	4	7	8		6			6	24
04:00	12	11	8	14		11			11	45
05:00	34	27	41	25		31			31	127
06:00	128	163	161	141		148			148	593
07:00	328	327	319	379		338			338	1353
08:00	492	502	545	578		529			529	2117
09:00	403	411	404	397		403			403	1615
10:00	312	308	319	354		323			323	1293
11:00	290	280	360	314		311			311	1244
12:00	301	302	287	301		297			297	1191
13:00	270	282	312	320		296			296	1184
14:00	286	321	345	385		334			334	1337
15:00	302	316	309	356		320			320	1283
16:00	293	347	317	451		352			352	1408
17:00	237	296	337	430		325			325	1300
18:00	250	244	329	353		294			294	1176
19:00	214	208	309			243			243	731
20:00	129	164	293			195			195	586
21:00	134	117	215			155			155	466
22:00	76	112	137			108			108	325
23:00	56	55	90			67			67	201
24:00	40	48	56			48			48	144
TOTALS	4624	4869	5534	4826	0	5160	0	0	5160	19853
% AVG WKDY	89.6	94.3	107.2	93.5						
% AVG WEEK	89.6	94.3	107.2	93.5						
AM Times	08:00	08:00	08:00	08:00		08:00			08:00	
AM Peaks	492	502	545	578		529			529	
PM Times	15:00	16:00	14:00	16:00		16:00			16:00	
PM Peaks	302	347	345	451		352			352	

MassDOT Highway Division  
 WEEKLY SUMMARY FOR LANE 2  
 Starting: 6/1/2015

Page: 2

*STA 4 SB*

Site Reference: 150140000513  
 Site ID: 000000000401  
 Location: NAHANT RD., SOUTH OF NAHANT ROTARY  
 Direction: SOUTH

File: 40102.prn  
 City: LYNN  
 County: VOL N&S

TIME	MON 1	TUE 2	WED 3	THU 4	FRI	WKDAY AVG	SAT	SUN	WEEK AVG	TOTAL
01:00	30	27	42	31		32			32	130
02:00	22	23	25	19		22			22	89
03:00	6	5	5	10		6			6	26
04:00	7	8	16	12		10			10	43
05:00	14	13	27	23		19			19	77
06:00	28	47	39	62		44			44	176
07:00	86	84	101	123		98			98	394
08:00	151	146	193	207		174			174	697
09:00	213	184	208	248		213			213	853
10:00	223	205	267	261		239			239	956
11:00	214	225	285	264		247			247	988
12:00	279	294	304	280		289			289	1157
13:00	282	320	334	340		319			319	1276
14:00	325	332	310	346		328			328	1313
15:00	326	366	386	387		366			366	1465
16:00	365	413	418	411		401			401	1607
17:00	418	389	512	492		452			452	1811
18:00	464	436	563	553		504			504	2016
19:00	416	467.	447			443			443	1330
20:00	300	333	370			334			334	1003
21:00	218	247	302			255			255	767
22:00	140	171	236			182			182	547
23:00	83	128	149			120			120	360
24:00	59	60	82			67			67	201
TOTALS	4669	4923	5621	4069	0	5164	0	0	5164	19282
% AVG WKDY	90.4	95.3	108.8	78.7						
% AVG WEEK	90.4	95.3	108.8	78.7						
AM Times	12:00	12:00	12:00	12:00		12:00			12:00	
AM Peaks	279	294	304	280		289			289	
PM Times	18:00	19:00	18:00	18:00		18:00			18:00	
PM Peaks	464	467	563	553		504			504	

MassDOT Highway Division  
WEEKLY SUMMARY FOR LANE:  
Starting: 6/1/2015

Page: 3

*STA. 5 TOTAL*

Site Reference: 150140000645

Site ID: 000000000501

Location: LYNN SHORE DR., NORTH OF NAHANT ROTARY

Direction: ROAD TOTAL

File: 50102.prn

City: LYNN

County: VOL N&S

TIME	MON 1	TUE 2	WED 3	THU 4	FRI	WKDAY AVG	SAT	SUN	WEEK AVG	TOTAL
01:00	178	172	208	223		195			195	781
02:00	114	112	122	137		121			121	485
03:00	69	61	80	78		72			72	288
04:00	75	73	83	87		79			79	318
05:00	235	193	208	226		215			215	862
06:00	756	820	785	736		774			774	3097
07:00	1648	1714	1770	1793		1731			1731	6925
08:00	2093	2205	2236	2184		2179			2179	8718
09:00	1890	2029	1949	2105		1993			1993	7973
10:00	1414	1501	1617	1638		1542			1542	6170
11:00	1302	1359	1429	1455		1386			1386	5545
12:00	1333	1399	1426	1570		1432			1432	5728
13:00	1342	1449	1531	1643		1491			1491	5965
14:00	1434	1638	1629	1748		1612			1612	6449
15:00	1677	1938	1935	1947		1874			1874	7497
16:00	1917	2204	2275	2306		2175			2175	8702
17:00	2109	2458	2584	2382		2383			2383	9533
18:00	2209	2503	2523	2552		2446			2446	9787
19:00	2079	2371	2362			2270			2270	6812
20:00	1392	1542	1850			1594			1594	4784
21:00	965	1089	1352			1135			1135	3406
22:00	749	899	1095			914			914	2743
23:00	492	621	744			619			619	1857
24:00	323	392	481			398			398	1196
TOTALS	27795	30742	32274	24810	0	30630	0	0	30630	115621
% AVG WKDY	90.7	100.3	105.3	80.9						
% AVG WEEK	90.7	100.3	105.3	80.9						
AM Times	08:00	08:00	08:00	08:00		08:00			08:00	
AM Peaks	2093	2205	2236	2184		2179			2179	
PM Times	18:00	18:00	17:00	18:00		18:00			18:00	
PM Peaks	2209	2503	2584	2552		2446			2446	
D%	70	70	65	65						
K%	8	8	8	10						

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Comb AWD 30630

FAC .91 (.96)

Comb ADT 26,800

MassDOT Highway Division  
 WEEKLY SUMMARY FOR LANE 1  
 Starting: 6/1/2015

Page: 1

STA 5 NB

Site Reference: 150140000645

Site ID: 000000000501

Location: LYNN SHORE DR., NORTH OF NAHANT ROTARY

Direction: NORTH

File: 50102.prn

City: LYNN

County: VOL N&S

TIME	MON 1	TUE 2	WED 3	THU 4	FRI	WKDAY AVG	SAT	SUN	WEEK AVG	TOTAL
01:00	122	126	148	163		139			139	559
02:00	81	78	86	97		85			85	342
03:00	45	39	42	44		42			42	170
04:00	29	24	33	35		30			30	121
05:00	64	44	52	47		51			51	207
06:00	156	182	163	143		161			161	644
07:00	320	347	367	390		356			356	1424
08:00	698	807	778	757		760			760	3040
09:00	638	664	709	783		698			698	2794
10:00	504	537	595	606		560			560	2242
11:00	549	620	639	659		616			616	2467
12:00	608	688	679	772		686			686	2747
13:00	647	721	755	825		737			737	2948
14:00	730	913	871	926		860			860	3440
15:00	928	1142	1111	1080		1065			1065	4261
16:00	1169	1438	1439	1424		1367			1367	5470
17:00	1399	1690	1676	1530		1573			1573	6295
18:00	1498	1772	1677	1681		1657			1657	6628
19:00	1523	1731	1699			1651			1651	4953
20:00	966	1080	1292			1112			1112	3338
21:00	638	707	889			744			744	2234
22:00	475	560	683			572			572	1718
23:00	329	417	492			412			412	1238
24:00	217	270	338			275			275	825
TOTALS	14333	16597	17213	11962	0	16209	0	0	16209	60105
% AVG WKDY	88.4	102.3	106.1	73.7						
% AVG WEEK	88.4	102.3	106.1	73.7						
AM Times	08:00	08:00	08:00	09:00		08:00			08:00	
AM Peaks	698	807	778	783		760			760	
PM Times	19:00	18:00	19:00	18:00		18:00			18:00	
PM Peaks	1523	1772	1699	1681		1657			1657	

MassDOT Highway Division  
 WEEKLY SUMMARY FOR LANE. 2  
 Starting: 6/1/2015

Page: 2

STA. 55B

Site Reference: 150140000645

Site ID: 000000000501

Location: LYNN SHORE DR., NORTH OF NAHANT ROTARY

Direction: SOUTH

File: 50102.prn

City: LYNN

County: VOL N&S

TIME	MON 1	TUE 2	WED 3	THU 4	FRI	WKDAY AVG	SAT	SUN	WEEK AVG	TOTAL
01:00	56	46	60	60		55			55	222
02:00	33	34	36	40		35			35	143
03:00	24	22	38	34		29			29	118
04:00	46	49	50	52		49			49	197
05:00	171	149	156	179		163			163	655
06:00	600	638	622	593		613			613	2453
07:00	1328	1367	1403	1403		1375			1375	5501
08:00	1395	1398	1458	1427		1419			1419	5678
09:00	1252	1365	1240	1322		1294			1294	5179
10:00	910	964	1022	1032		982			982	3928
11:00	753	739	790	796		769			769	3078
12:00	725	711	747	798		745			745	2981
13:00	695	728	776	818		754			754	3017
14:00	704	725	758	822		752			752	3009
15:00	749	796	824	867		809			809	3236
16:00	748	766	836	882		808			808	3232
17:00	710	768	908	852		809			809	3238
18:00	711	731	846	871		789			789	3159
19:00	556	640	663			619			619	1859
20:00	426	462	558			482			482	1446
21:00	327	382	463			390			390	1172
22:00	274	339	412			341			341	1025
23:00	163	204	252			206			206	619
24:00	106	122	143			123			123	371
TOTALS	13462	14145	15061	12848	0	14410	0	0	14410	55516
% AVG WKDY	93.4	98.1	104.5	89.1						
% AVG WEEK	93.4	98.1	104.5	89.1						
AM Times	08:00	08:00	08:00	08:00		08:00			08:00	
AM Peaks	1395	1398	1458	1427		1419			1419	
PM Times	15:00	15:00	17:00	16:00		15:00			15:00	
PM Peaks	749	796	908	882		809			809	

MassDOT Highway Division  
WEEKLY SUMMARY FOR LANE  
Starting: 6/1/2015

Page: 3

*STA 6 TOTAL*

Site Reference: 150140000714  
Site ID: 000000060102  
Location: WASHINGTON ST., NORTH OF AMITY ST.  
Direction: ROAD TOTAL

File: 60102.prn  
City: LYNN  
County: DIR VOL N&S

TIME	MON 1	TUE 2	WED 3	THU 4	FRI	WKDAY AVG	SAT	SUN	WEEK AVG	TOTAL
01:00	12	14	19	24		17			17	69
02:00	20	12	14	13		14			14	59
03:00	10	5	10	15		10			10	40
04:00	8	11	9	12		10			10	40
05:00	11	13	11	12		11			11	47
06:00	31	40	35	34		35			35	140
07:00	106	119	117	114		114			114	456
08:00	165	176	195	169		176			176	705
09:00	169	145	202	140		164			164	656
10:00	113	105	157	126		125			125	501
11:00	101	116	122	110		112			112	449
12:00	114	140	125	129		127			127	508
13:00	138	128	160	137		140			140	563
14:00	140	115	149	136		135			135	540
15:00	138	142	148	143		142			142	571
16:00	133	161	151	165		152			152	610
17:00	145	173	166	167		162			162	651
18:00	164	144	178	157		160			160	643
19:00	130	116	144			130			130	390
20:00	93	107	95			98			98	295
21:00	73	89	108			90			90	270
22:00	80	65	95			80			80	240
23:00	38	44	46			42			42	128
24:00	27	35	29			30			30	91

TOTALS	2159	2215	2485	1803	0	2276	0	0	2276	8662
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% AVG WKDY	94.8	97.3	109.1	79.2						
% AVG WEEK	94.8	97.3	109.1	79.2						

AM Times	09:00	08:00	09:00	08:00		08:00			08:00	
AM Peaks	169	176	202	169		176			176	

PM Times	18:00	17:00	18:00	17:00		17:00			17:00	
PM Peaks	164	173	178	167		162			162	

D%	60	65	60	60						
K%	8	8	8	9						

us

comb AWD 2276

FAC .87(91)

comb ADT 1,900

MassDOT Highway Division  
 WEEKLY SUMMARY FOR LANE 1  
 Starting: 6/1/2015

Page: 1

STA 6 NB

Site Reference: 150140000714  
 Site ID: 000000060102  
 Location: WASHINGTON ST., NORTH OF AMITY ST.  
 Direction: NORTH

File: 60102.prn  
 City: LYNN  
 County: DIR VOL N&S

TIME	MON 1	TUE 2	WED 3	THU 4	FRI	WKDAY AVG	SAT	SUN	WEEK AVG	TOTAL
01:00	3	10	9	13		8			8	35
02:00	13	6	9	7		8			8	35
03:00	7	4	4	10		6			6	25
04:00	6	7	8	8		7			7	29
05:00	8	8	8	9		8			8	33
06:00	16	21	16	19		18			18	72
07:00	72	77	77	78		76			76	304
08:00	105	118	127	104		113			113	454
09:00	101	77	119	73		92			92	370
10:00	40	55	74	44		53			53	213
11:00	40	47	56	45		47			47	188
12:00	51	82	56	57		61			61	246
13:00	71	63	84	58		69			69	276
14:00	60	49	72	56		59			59	237
15:00	70	76	71	67		71			71	284
16:00	61	74	66	82		70			70	283
17:00	75	92	78	81		81			81	326
18:00	78	73	88	76		78			78	315
19:00	66	46	49			53			53	161
20:00	49	51	39			46			46	139
21:00	31	52	62			48			48	145
22:00	47	40	56			47			47	143
23:00	13	19	26			19			19	58
24:00	10	14	12			12			12	36
TOTALS	1093	1161	1266	887	0	1150	0	0	1150	4407
% AVG WKDY	95	100.9	110	77.1						
% AVG WEEK	95	100.9	110	77.1						
AM Times	08:00	08:00	08:00	08:00		08:00			08:00	
AM Peaks	105	118	127	104		113			113	
PM Times	18:00	17:00	18:00	16:00		17:00			17:00	
PM Peaks	78	92	88	82		81			81	

MassDOT Highway Division  
 WEEKLY SUMMARY FOR LANE 2  
 Starting: 6/1/2015

Page: 2

STA. 6 SB

Site Reference: 150140000714  
 Site ID: 000000060102  
 Location: WASHINGTON ST., NORTH OF AMITY ST.  
 Direction: SOUTH

File: 60102.prn  
 City: LYNN  
 County: DIR VOL N&S

TIME	MON 1	TUE 2	WED 3	THU 4	FRI	WKDAY AVG	SAT	SUN	WEEK AVG	TOTAL
01:00	9	4	10	11		8			8	34
02:00	7	6	5	6		6			6	24
03:00	3	1	6	5		3			3	15
04:00	2	4	1	4		2			2	11
05:00	3	5	3	3		3			3	14
06:00	15	19	19	15		17			17	68
07:00	34	42	40	36		38			38	152
08:00	60	58	68	65		62			62	251
09:00	68	68	83	67		71			71	286
10:00	73	50	83	82		72			72	288
11:00	61	69	66	65		65			65	261
12:00	63	58	69	72		65			65	262
13:00	67	65	76	79		71			71	287
14:00	80	66	77	80		75			75	303
15:00	68	66	77	76		71			71	287
16:00	72	87	85	83		81			81	327
17:00	70	81	88	86		81			81	325
18:00	86	71	90	81		82			82	328
19:00	64	70	95			76			76	229
20:00	44	56	56			52			52	156
21:00	42	37	46			41			41	125
22:00	33	25	39			32			32	97
23:00	25	25	20			23			23	70
24:00	17	21	17			18			18	55
TOTALS	1066	1054	1219	916	0	1115	0	0	1115	4255
% AVG WKDY	95.6	94.5	109.3	82.1						
% AVG WEEK	95.6	94.5	109.3	82.1						
AM Times	10:00	11:00	09:00	10:00		10:00			10:00	
AM Peaks	73	69	83	82		72			72	
PM Times	18:00	16:00	19:00	17:00		18:00			18:00	
PM Peaks	86	87	95	86		82			82	

MassDOT Highway Division  
WEEKLY SUMMARY FOR LANE  
Starting: 6/1/2015

Page: 3

*STA. 7 TOTAL*

Site Reference: 150140000426

Site ID: 000000070102

Location: BROAD ST., WEST OF WASHINGTON ST.

Direction: ROAD TOTAL

File: 70102.prn

City: LYNN

County: DIR VOL N&S

TIME	MON 1	TUE 2	WED 3	THU 4	FRI	WKDAY AVG	SAT	SUN	WEEK AVG	TOTAL
01:00	150	145	165	154		153			153	614
02:00	116	98	81	99		98			98	394
03:00	73	53	83	73		70			70	282
04:00	69	67	76	67		69			69	279
05:00	97	98	100	85		95			95	380
06:00	253	266	250	247		254			254	1016
07:00	741	744	756	749		747			747	2990
08:00	1013	1111	1027	1094		1061			1061	4245
09:00	985	1049	1029	984		1011			1011	4047
10:00	788	843	812	873		829			829	3316
11:00	813	822	802	816		813			813	3253
12:00	850	889	870	858		866			866	3467
13:00	962	967	946	921		949			949	3796
14:00	972	977	994	979		980			980	3922
15:00	1015	1036	1034	1061		1036			1036	4146
16:00	1157	1110	1055	1177		1124			1124	4499
17:00	1133	1161	1181	1233		1177			1177	4708
18:00	1320	1330	1327	1359		1334			1334	5336
19:00	1045	1117	1176			1112			1112	3338
20:00	811	781	837			809			809	2429
21:00	636	599	680			638			638	1915
22:00	534	509	574			539			539	1617
23:00	333	358	419			370			370	1110
24:00	199	213	245			219			219	657
TOTALS	16065	16343	16519	12829	0	16353	0	0	16353	61756
% AVG WKDY	98.2	99.9	101	78.4						
% AVG WEEK	98.2	99.9	101	78.4						
AM Times	08:00	08:00	09:00	08:00		08:00			08:00	
AM Peaks	1013	1111	1029	1094		1061			1061	
PM Times	18:00	18:00	18:00	18:00		18:00			18:00	
PM Peaks	1320	1330	1327	1359		1334			1334	
D%	50	55	55	55						
K%	8	8	8	11						

u5

comb AWD 16353

FAC .87(.97)

comb ADT 13,800

MassDOT Highway Division  
 WEEKLY SUMMARY FOR LANE 1  
 Starting: 6/1/2015

Page: 1

*STA. 7 NB*

Site Reference: 150140000426

Site ID: 000000070102

Location: BROAD ST., WEST OF WASHINGTON ST.

Direction: NORTH

File: 70102.prn

City: LYNN

County: DIR VOL N&S

TIME	MON 1	TUE 2	WED 3	THU 4	FRI	WKDAY AVG	SAT	SUN	WEEK AVG	TOTAL
01:00	70	85	88	79		80			80	322
02:00	63	47	44	56		52			52	210
03:00	35	23	33	30		30			30	121
04:00	32	22	33	30		29			29	117
05:00	34	36	33	27		32			32	130
06:00	75	86	75	63		74			74	299
07:00	143	169	165	152		157			157	629
08:00	274	269	281	324		287			287	1148
09:00	332	329	336	302		324			324	1299
10:00	284	293	314	308		299			299	1199
11:00	328	320	314	346		327			327	1308
12:00	338	339	340	332		337			337	1349
13:00	422	409	395	386		403			403	1612
14:00	443	423	442	435		435			435	1743
15:00	419	467	425	444		438			438	1755
16:00	558	511	525	541		533			533	2135
17:00	570	587	578	593		582			582	2328
18:00	686	731	744	753		728			728	2914
19:00	586	580	642			602			602	1808
20:00	432	380	415			409			409	1227
21:00	295	297	311			301			301	903
22:00	224	222	273			239			239	719
23:00	167	199	210			192			192	576
24:00	87	122	128			112			112	337
TOTALS	6897	6946	7144	5201	0	7002	0	0	7002	26188
% AVG WKDY	98.5	99.2	102	74.2						
% AVG WEEK	98.5	99.2	102	74.2						
AM Times	12:00	12:00	12:00	11:00		12:00			12:00	
AM Peaks	338	339	340	346		337			337	
PM Times	18:00	18:00	18:00	18:00		18:00			18:00	
PM Peaks	686	731	744	753		728			728	

MassDOT Highway Division  
 WEEKLY SUMMARY FOR LANE 2  
 Starting: 6/1/2015

Page: 2

STA 7 SB

Site Reference: 150140000426

File: 70102.prn

Site ID: 000000070102

City: LYNN

Location: BROAD ST., WEST OF WASHINGTON ST.

County: DIR VOL N&S

Direction: SOUTH

TIME	MON 1	TUE 2	WED 3	THU 4	FRI	WKDAY AVG	SAT	SUN	WEEK AVG	TOTAL
01:00	80	60	77	75		73			73	292
02:00	53	51	37	43		46			46	184
03:00	38	30	50	43		40			40	161
04:00	37	45	43	37		40			40	162
05:00	63	62	67	58		62			62	250
06:00	178	180	175	184		179			179	717
07:00	598	575	591	597		590			590	2361
08:00	739	842	746	770		774			774	3097
09:00	653	720	693	682		687			687	2748
10:00	504	550	498	565		529			529	2117
11:00	485	502	488	470		486			486	1945
12:00	512	550	530	526		529			529	2118
13:00	540	558	551	535		546			546	2184
14:00	529	554	552	544		544			544	2179
15:00	596	569	609	617		597			597	2391
16:00	599	599	530	636		591			591	2364
17:00	563	574	603	640		595			595	2380
18:00	634	599	583	606		605			605	2422
19:00	459	537	534			510			510	1530
20:00	379	401	422			400			400	1202
21:00	341	302	369			337			337	1012
22:00	310	287	301			299			299	898
23:00	166	159	209			178			178	534
24:00	112	91	117			106			106	320
TOTALS	9168	9397	9375	7628	0	9343	0	0	9343	35568
% AVG WKDY	98.1	100.5	100.3	81.6						
% AVG WEEK	98.1	100.5	100.3	81.6						
AM Times	08:00	08:00	08:00	08:00		08:00			08:00	
AM Peaks	739	842	746	770		774			774	
PM Times	18:00	16:00	15:00	17:00		18:00			18:00	
PM Peaks	634	599	609	640		605			605	

## **Turning Movement Volumes**

<b>Study Name</b>	Lynn - Route 1A/Lynnway at Harding Street and Dealership Driveway TM1 TMC
<b>Start Date</b>	Thursday, May 28, 2015 7:00 AM
<b>End Date</b>	Saturday, May 30, 2015 2:00 PM
<b>Site Code</b>	

## Report Summary

Time Period	Class.	Southbound					Westbound					Northbound					Eastbound					Crosswalk							
		R	T	L	U	I	O	R	T	L	U	I	O	R	T	L	U	I	O	R	T	L	U	I	O	Total	Pedestrians	Total	
Peak 1	Motorcycles	0	3	0	0	3	3	0	0	0	0	0	0	0	3	0	0	3	3	0	0	0	0	0	6	N	0	0	
Specified Period	%	0%	0%	0%	0%	0%	0%	0%	0%	0%	0%	0%	0%	0%	0%	0%	0%	0%	0%	0%	0%	0%	0%	0%	0%	0%	0%		
7:00 AM - 9:00 AM	Cars	13	2330	11	50	2404	819	2	0	19	0	21	21	10	764	6	14	794	2363	0	0	3	19	3222	E	2	2		
One Hour Peak	%	93%	91%	85%	93%	91%	85%	100%	0%	73%	0%	75%	64%	50%	85%	86%	100%	84%	91%	0%	0%	75%	0%	75%	90%	89%	100%		
7:00 AM - 8:00 AM	Light Goods Vehicles	0	173	1	4	178	90	0	0	0	0	0	5	4	86	1	0	91	173	0	0	0	0	1	269	S	0	0	
	%	0%	7%	8%	7%	7%	9%	0%	0%	0%	0%	0%	15%	20%	10%	14%	0%	10%	7%	0%	0%	0%	0%	5%	7%	0%			
	Buses	0	22	0	0	22	16	0	0	0	0	0	0	0	16	0	0	16	22	0	0	0	0	0	38	W	6	6	
	%	0%	1%	0%	1%	2%	0%	0%	0%	0%	0%	0%	0%	0%	2%	0%	0%	2%	1%	0%	0%	0%	0%	0%	1%	100%			
	Single-Unit Trucks	1	29	1	0	31	29	0	0	5	0	5	7	6	28	0	0	34	34	0	0	1	0	1	1	71	8	8	
	%	7%	1%	8%	0%	1%	3%	0%	0%	19%	0%	18%	21%	30%	3%	0%	0%	4%	1%	0%	0%	25%	0%	25%	5%	2%			
	Articulated Trucks	0	6	0	0	6	3	0	0	2	0	2	0	0	3	0	0	3	8	0	0	0	0	0	0	11			
	%	0%	0%	0%	0%	0%	0%	0%	0%	8%	0%	7%	0%	0%	0%	0%	0%	0%	0%	0%	0%	0%	0%	0%	0%				
	Bicycles on Road	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0			
	%	0%	0%	0%	0%	0%	0%	0%	0%	0%	0%	0%	0%	0%	0%	0%	0%	0%	0%	0%	0%	0%	0%	0%	0%				
	<b>Total</b>	<b>14</b>	<b>2563</b>	<b>13</b>	<b>54</b>	<b>2644</b>	<b>960</b>	<b>2</b>	<b>0</b>	<b>26</b>	<b>0</b>	<b>28</b>	<b>33</b>	<b>20</b>	<b>900</b>	<b>7</b>	<b>14</b>	<b>941</b>	<b>2603</b>	<b>0</b>	<b>0</b>	<b>4</b>	<b>0</b>	<b>4</b>	<b>21</b>	<b>3617</b>			
	PHF	0.44	0.88	0.65	0.79	0.89	0.86	0.5	0	0.65	0	0.64	0.82	0.71	0.84	0.58	0.5	0.84	0.88	0	0	0.5	0	0.5	0.48	0.91			
	Approach %					73%	27%						1%	1%												0%	1%		
Peak 2	Motorcycles	0	4	0	4	8	12	1	0	0	0	1	0	0	7	0	0	7	4	0	0	0	0	0	16	N	4	4	
Specified Period	%	0%	0%	0%	4%	1%	0%	3%	0%	0%	0%	1%	0%	0%	0%	0%	0%	0%	0%	0%	0%	0%	0%	0%	0%	100%			
4:00 PM - 6:00 PM	Cars	12	1132	55	97	1296	2237	27	0	36	0	63	109	54	2088	0	41	2183	1210	1	0	25	0	26	12	3568	E	8	8
One Hour Peak	%	80%	92%	86%	93%	91%	91%	69%	0%	88%	0%	79%	87%	87%	91%	0%	98%	91%	91%	33%	0%	86%	0%	81%	71%	91%	100%		
4:30 PM - 5:30 PM	Light Goods Vehicles	0	80	4	3	87	161	2	0	3	0	5	5	1	154	1	1	157	84	0	0	2	0	2	1	251	S	2	2
	%	0%	6%	6%	3%	6%	7%	5%	0%	7%	0%	6%	4%	2%	7%	50%	2%	7%	6%	0%	0%	7%	0%	6%	6%	6%	100%		
	Buses	0	9	0	0	9	17	0	0	0	0	0	0	0	17	0	0	17	9	0	0	0	0	0	26	W	20	20	
	%	0%	1%	0%	0%	1%	1%	0%	0%	0%	0%	0%	0%	0%	1%	0%	0%	1%	0%	0%	0%	0%	0%	0%	0%	100%			
	Single-Unit Trucks	3	11	4	0	18	23	6	0	1	0	7	11	7	15	1	0	23	14	2	0	2	0	4	4	52	34	34	
	%	20%	1%	6%	0%	1%	1%	15%	0%	2%	0%	9%	9%	11%	1%	50%	0%	1%	1%	67%	0%	7%	0%	13%	24%	1%			
	Articulated Trucks	0	0	1	0	1	5	3	0	1	0	4	1	0	2	0	0	2	1	0	0	0	0	0	0	7			
	%	0%	0%	2%	0%	0%	5%	0%	2%	0%	5%	1%	0%	0%	0%	0%	0%	0%	0%	0%	0%	0%	0%	0%	0%	0%			
	Bicycles on Road	0	1	0	0	1	0	0	0	0	0	0	0	0	0	0	0	0	1	0	0	0	0	0	0	1			
	<b>Total</b>	<b>15</b>	<b>1237</b>	<b>64</b>	<b>104</b>	<b>1420</b>	<b>2455</b>	<b>39</b>	<b>0</b>	<b>41</b>	<b>0</b>	<b>80</b>	<b>126</b>	<b>62</b>	<b>2283</b>	<b>2</b>	<b>42</b>	<b>2389</b>	<b>1323</b>	<b>3</b>	<b>0</b>	<b>29</b>	<b>0</b>	<b>32</b>	<b>17</b>	<b>3921</b>			
	PHF	0.75	0.9	0.55	0.84	0.95	0.96	0.75	0	0.79	0	0.83	0.79	0.82	0.96	0.5	0.75	0.97	0.91	0.25	0	0.91	0	0.73	0.71	0.99			
	Approach %					36%	63%					2%	3%						61%	34%					1%	0%			

**Study Name** Lynn - Route 1A/Lynnway at Harding Street and Dealership Driveway TM1 TMC  
**Start Date** Thursday, May 28, 2015 7:00 AM  
**End Date** Saturday, May 30, 2015 2:00 PM  
**Site Code**

## Report Summary

Time Period	Class.	Southbound						Westbound						Northbound						Eastbound						Crosswalk				
		R	T	L	U	I	O	R	T	L	U	I	O	R	T	L	U	I	O	R	T	L	U	I	O	Total	Pedestrians	Total		
Peak 1	Motorcycles	0	19	1	1	21	21	0	0	0	0	0	4	3	20	0	0	23	19	0	0	0	0	0	44	N	0	0		
Specified Period	%	0%	1%	1%	1%	1%	1%	0%	0%	0%	0%	0%	2%	4%	1%	0%	0%	1%	1%	0%	0%	0%	0%	0%	0%	1%	0%	0%		
12:00 PM - 2:00 PM	Cars	6	1482	86	102	1676	1562	35	1	31	0	67	155	67	1415	2	77	1561	1593	3	2	10	0	15	9	3319	E	14	14	
One Hour Peak	%	43%	91%	91%	97%	91%	91%	85%	100%	89%	0%	87%	91%	92%	91%	100%	96%	91%	91%	60%	100%	71%	0%	71%	53%	91%	100%			
12:45 PM - 1:45 PM	Light Goods Vehicles	4	91	4	2	101	97	2	0	1	0	3	5	1	91	0	2	94	94	0	0	2	0	2	4	200	S	0	0	
	%	29%	6%	4%	2%	5%	6%	5%	0%	3%	0%	4%	3%	1%	6%	0%	3%	6%	5%	0%	0%	14%	0%	10%	24%	5%	0%			
	Buses	0	12	0	0	12	10	0	0	0	0	0	0	0	0	0	0	0	10	12	0	0	0	0	0	0	22	W	15	15
	%	0%	1%	0%	0%	1%	1%	0%	0%	0%	0%	0%	0%	0%	0%	1%	0%	0%	1%	1%	0%	0%	0%	0%	0%	1%	0%	100%		
	Single-Unit Trucks	2	22	3	0	27	13	0	0	0	1	0	1	4	1	12	0	1	14	25	1	0	1	0	2	2	44		29	29
	%	14%	1%	3%	0%	1%	1%	0%	0%	3%	0%	1%	2%	1%	1%	0%	1%	1%	1%	20%	0%	7%	0%	10%	12%	1%				
	Articulated Trucks	2	2	1	0	5	8	4	0	2	0	6	2	1	3	0	0	4	5	1	0	1	0	2	2	17				
	%	14%	0%	1%	0%	0%	0%	10%	0%	6%	0%	8%	1%	1%	0%	0%	0%	0%	20%	0%	7%	0%	10%	12%	0%					
	Bicycles on Road	0	3	0	0	3	3	0	0	0	0	0	0	0	0	3	0	0	3	3	0	0	0	0	0	0	6			
	%	0%	0%	0%	0%	0%	0%	0%	0%	0%	0%	0%	0%	0%	0%	0%	0%	0%	0%	0%	0%	0%	0%	0%	0%	0%	0%			
	<b>Total</b>	<b>14</b>	<b>1631</b>	<b>95</b>	<b>105</b>	<b>1845</b>	<b>1714</b>	<b>41</b>	<b>1</b>	<b>35</b>	<b>0</b>	<b>77</b>	<b>170</b>	<b>73</b>	<b>1554</b>	<b>2</b>	<b>80</b>	<b>1709</b>	<b>1751</b>	<b>5</b>	<b>2</b>	<b>14</b>	<b>0</b>	<b>21</b>	<b>17</b>	<b>3652</b>				
	PHF	0.58	0.96	0.85	0.82	0.95	0.95	0.68	0.25	0.8	0	0.71	0.82	0.7	0.91	0.5	0.77	0.94	0.95	0.42	0.25	0.5	0	0.58	0.61	0.98				
	Approach %					51%	47%					2%	5%						47%	48%					1%	0%				

**Study Name** Lynn - Route 1A/Lynnway and Commercial Street TM2 TMC  
**Start Date** Thursday, May 28, 2015 7:00 AM  
**End Date** Saturday, May 30, 2015 2:00 PM  
**Site Code**

## Report Summary

Time Period	Class.	Southbound						Westbound						Northbound						Eastbound						Total	Pedestrians	Crosswalk		
		R	T	L	U	I	O	I	O	R	T	L	U	I	O	R	T	L	U	I	O	R	T	L	U	I	O			
<b>Peak 1</b>	Motorcycles	1	1	0	0	2	3	0	0	0	2	0	0	2	3	2	0	1	0	3	1	7	N	2	2					
Specified Period	%	0%	0%	0%	0%	0%	0%	0%	0%	0%	0%	0%	0%	0%	0%	0%	0%	0%	0%	0%	0%	0%	0%	0%	0%	0%	0%	100%		
7:00 AM - 9:00 AM	Cars	234	1913	0	0	2147	838	0	76	3	648	184	24	859	2442	505	73	190	0	768	418	3774	E	7	7					
One Hour Peak	%	85%	91%	0%	0%	91%	83%	0%	75%	38%	85%	79%	89%	83%	91%	91%	78%	78%	0%	86%	82%	88%		100%						
7:00 AM - 8:00 AM	Light Goods Vehicles	24	134	0	0	158	107	0	15	1	68	25	2	96	168	32	14	39	0	85	49	339	S	4	4					
	%	9%	6%	0%	0%	7%	11%	0%	15%	13%	9%	11%	7%	9%	6%	6%	15%	16%	0%	10%	10%	8%		100%						
	Buses	8	21	0	0	29	16	0	1	0	12	3	1	16	24	2	1	4	0	7	11	52	W	4	4					
	%	3%	1%	0%	0%	1%	2%	0%	1%	0%	2%	1%	4%	2%	1%	0%	1%	2%	0%	1%	2%	1%		100%						
	Single-Unit Trucks	6	16	0	0	22	41	0	9	3	31	20	0	54	28	12	6	10	0	28	26	104		17	17					
	%	2%	1%	0%	0%	1%	4%	0%	9%	38%	4%	9%	0%	5%	1%	2%	6%	4%	0%	3%	5%	2%								
	Articulated Trucks	1	6	0	0	7	5	0	1	1	4	1	0	6	6	0	0	1	0	1	2	14								
	%	0%	0%	0%	0%	0%	0%	0%	1%	13%	1%	0%	0%	1%	0%	0%	0%	0%	0%	0%	0%	0%								
	Bicycles on Road	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0								
	%	0%	0%	0%	0%	0%	0%	0%	0%	0%	0%	0%	0%	0%	0%	0%	0%	0%	0%	0%	0%	0%								
	<b>Total</b>	<b>274</b>	<b>2091</b>	<b>0</b>	<b>0</b>	<b>2365</b>	<b>1010</b>	<b>0</b>	<b>102</b>	<b>8</b>	<b>765</b>	<b>233</b>	<b>27</b>	<b>1033</b>	<b>2671</b>	<b>553</b>	<b>94</b>	<b>245</b>	<b>0</b>	<b>892</b>	<b>507</b>	<b>4290</b>								
	PHF	0.84	0.95	0	0	0.97	0.84	0	0.85	0.67	0.87	0.91	0.75	0.9	0.95	0.82	0.87	0.75	0	0.92	0.94	0.97								
	Approach %					55%	24%	0%	2%					24%	62%							21%	12%							
<b>Peak 2</b>	Motorcycles	2	3	0	0	5	1	0	1	0	1	10	2	13	7	2	1	0	0	3	12	21	N	0	0					
Specified Period	%	1%	0%	0%	0%	0%	0%	0%	4%	0%	0%	2%	5%	0%	1%	1%	4%	0%	0%	0%	1%	0%	0%							
4:00 PM - 6:00 PM	Cars	249	963	0	0	1212	2192	0	22	1	1917	465	35	2418	1250	252	21	275	0	548	714	4178	E	3	3					
One Hour Peak	%	85%	90%	0%	0%	89%	92%	0%	79%	33%	93%	87%	88%	92%	89%	88%	84%	83%	0%	85%	86%	90%		100%						
4:30 PM - 5:30 PM	Light Goods Vehicles	31	82	0	0	113	152	0	1	0	104	45	3	152	107	22	1	48	0	71	76	336	S	13	13					
	%	11%	8%	0%	0%	8%	6%	0%	4%	0%	5%	8%	8%	6%	8%	8%	4%	14%	0%	11%	9%	7%		100%						
	Buses	1	8	0	0	9	23	0	0	0	18	2	0	20	9	1	0	5	0	6	3	35	W	6	6					
	%	0%	1%	0%	0%	1%	1%	0%	0%	1%	0%	0%	1%	0%	0%	0%	0%	2%	0%	1%	0%	1%		100%						
	Single-Unit Trucks	8	13	0	0	21	15	0	4	2	11	14	0	27	21	8	2	4	0	14	22	62		22	22					
	%	3%	1%	0%	0%	2%	1%	0%	14%	67%	1%	3%	0%	1%	2%	3%	8%	1%	0%	2%	3%	1%								
	Articulated Trucks	1	3	0	0	4	7	0	0	0	6	1	0	7	3	0	0	1	0	1	2	12								
	%	0%	0%	0%	0%	0%	0%	0%	0%	0%	0%	0%	0%	0%	0%	0%	0%	0%	0%	0%	0%	0%		0%	0%					
	Bicycles on Road	0	1	0	0	1	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	1		
	%	0%	0%	0%	0%	0%	0%	0%	0%	0%	0%	0%	0%	0%	0%	0%	0%	0%	0%	0%	0%	0%	0%	0%	0%	0%	0%	0%		
	<b>Total</b>	<b>292</b>	<b>1073</b>	<b>0</b>	<b>0</b>	<b>1365</b>	<b>2390</b>	<b>0</b>	<b>28</b>	<b>3</b>	<b>2057</b>	<b>537</b>	<b>40</b>	<b>2637</b>	<b>1398</b>	<b>285</b>	<b>25</b>	<b>333</b>	<b>0</b>	<b>643</b>	<b>829</b>	<b>4645</b>								
	PHF	0.96	0.88	0	0	0.91	1	0	0.58	0.38	0.97	0.87	0.83	0.94	0.94	0.9	0.52	0.82	0	0.88	0.92	0.97								
	Approach %					29%	51%	0%	1%					57%	30%							14%	18%							

<b>Study Name</b>	Lynn - Route 1A/Lynnway and Commercial Street TM2 TMC
<b>Start Date</b>	Thursday, May 28, 2015 7:00 AM
<b>End Date</b>	Saturday, May 30, 2015 2:00 PM
<b>Site Code</b>	

## Report Summary

**Study Name** Lynn - Route 1A/Lynnfield at Marine Boulevard and Shepard Street TMC  
**Start Date** Thursday, May 28, 2015 7:00 AM  
**End Date** Saturday, May 30, 2015 2:00 PM  
**Site Code**

## Report Summary

Time Period	Class.	Southbound						Westbound						Northbound						Eastbound						Crosswalk						
		R	T	L	U	I	O	R	T	L	U	I	O	R	T	L	U	I	O	R	T	L	U	I	O	Total	Pedestrians	Total				
<b>Peak 1</b>	Motorcycles	0	5	0	0	5	2	0	0	0	0	0	0	0	2	0	0	0	2	5	0	0	0	0	0	7	N	0	0			
Specified Period	%	0%	0%	0%	0%	0%	0%	0%	0%	0%	0%	0%	0%	0%	0%	0%	0%	0%	0%	0%	0%	0%	0%	0%	0%	0%	0%	0%	0%			
7:00 AM - 9:00 AM	Cars	29	2029	6	53	2117	1016	1	0	2	0	3	15	4	942	36	3	985	2049	15	5	20	0	40	65	3145	E	7	7			
One Hour Peak	%	81%	91%	86%	84%	91%	86%	25%	0%	18%	0%	20%	47%	22%	87%	82%	100%	86%	91%	100%	71%	59%	0%	71%	81%	89%		100%				
7:30 AM - 8:30 AM	Light Goods Vehicles	5	124	0	9	138	98	1	0	3	0	4	4	3	76	3	0	82	127	0	1	12	0	13	8	237	S	0	0			
	%	14%	6%	0%	14%	6%	8%	25%	0%	27%	0%	27%	13%	17%	7%	7%	0%	7%	6%	0%	14%	35%	0%	23%	10%	7%		0%				
	Buses	1	27	1	0	29	16	1	0	3	0	4	12	10	15	3	0	28	30	0	1	0	0	1	4	62	W	9	9			
	%	3%	1%	14%	0%	1%	1%	25%	0%	27%	0%	27%	38%	56%	1%	7%	0%	2%	1%	0%	14%	0%	0%	2%	5%	2%		100%				
	Single-Unit Trucks	1	29	0	0	30	45	1	0	1	0	2	0	0	42	2	0	44	30	0	0	2	0	2	3	78		16	16			
	%	3%	1%	0%	0%	1%	4%	25%	0%	9%	0%	13%	0%	0%	4%	5%	0%	4%	1%	0%	0%	6%	0%	4%	4%	2%						
	Articulated Trucks	0	12	0	0	12	5	0	0	2	0	2	1	1	5	0	0	6	14	0	0	0	0	0	0	20						
	%	0%	1%	0%	0%	1%	0%	0%	0%	18%	0%	13%	3%	6%	0%	0%	1%	1%	0%	0%	0%	0%	0%	0%	0%	1%						
	Bicycles on Road	0	1	0	1	2	1	0	0	0	0	0	0	0	0	0	0	0	0	1	0	0	0	0	0	0	0	0	2			
	%	0%	0%	0%	2%	0%	0%	0%	0%	0%	0%	0%	0%	0%	0%	0%	0%	0%	0%	0%	0%	0%	0%	0%	0%	0%	0%	0%	0%			
	<b>Total</b>	<b>36</b>	<b>2227</b>	<b>7</b>	<b>63</b>	<b>2333</b>	<b>1183</b>	<b>4</b>	<b>0</b>	<b>11</b>	<b>0</b>	<b>15</b>	<b>32</b>	<b>18</b>	<b>1082</b>	<b>44</b>	<b>3</b>	<b>1147</b>	<b>2256</b>	<b>15</b>	<b>7</b>	<b>34</b>	<b>0</b>	<b>56</b>	<b>80</b>	<b>3551</b>						
	PHF	0.64	0.96	0.58	0.61	0.95	0.94	0.5	0	0.92	0	0.75	0.8	0.5	0.94	0.69	0.38	0.93	0.96	0.54	0.44	0.71	0	0.82	0.67	0.95						
	Approach %					66%	33%					0%	1%							32%	64%					2%	2%					
<b>Peak 2</b>	Motorcycles	0	6	0	0	6	0	0	0	0	0	0	0	0	0	1	0	1	6	0	0	0	0	0	1	7	N	0	0			
Specified Period	%	0%	0%	0%	0%	0%	0%	0%	0%	0%	0%	0%	0%	0%	0%	1%	0%	0%	0%	0%	0%	0%	0%	0%	0%	1%	0%		0%			
4:00 PM - 6:00 PM	Cars	17	1139	0	29	1185	2117	9	2	16	0	27	9	8	2049	123	22	2202	1195	18	1	30	0	49	142	3463	E	2	2			
One Hour Peak	%	94%	88%	0%	91%	88%	92%	90%	67%	89%	0%	87%	45%	47%	92%	81%	96%	91%	88%	78%	50%	81%	0%	79%	83%	90%		100%				
4:30 PM - 5:30 PM	Light Goods Vehicles	0	110	0	3	113	151	1	0	1	0	2	2	2	140	21	1	164	117	5	0	7	0	12	21	291	S	4	4			
	%	0%	9%	0%	9%	8%	7%	10%	0%	6%	0%	6%	10%	12%	6%	14%	4%	7%	9%	22%	0%	19%	0%	19%	12%	8%		100%				
	Buses	1	10	0	0	11	19	0	1	0	0	1	5	4	19	4	0	27	10	0	1	0	0	1	6	40	W	10	10			
	%	6%	1%	0%	0%	1%	1%	0%	33%	0%	0%	3%	25%	24%	1%	3%	0%	1%	1%	0%	50%	0%	0%	2%	3%	1%		100%				
	Single-Unit Trucks	0	19	1	0	20	19	0	0	1	0	1	3	2	19	2	0	23	20	0	0	0	0	0	2	44		16	16			
	%	0%	1%	100%	0%	1%	1%	0%	0%	5%	0%	3%	15%	12%	1%	1%	0%	1%	1%	0%	0%	0%	0%	0%	1%	1%						
	Articulated Trucks	0	4	0	0	4	6	0	0	0	0	0	1	1	6	0	0	7	4	0	0	0	0	0	0	11						
	%	0%	0%	0%	0%	0%	0%	0%	0%	0%	0%	0%	5%	6%	0%	0%	0%	0%	0%	0%	0%	0%	0%	0%	0%	0%	0%	0%	0%			
	Bicycles on Road	0	1	0	0	1	1	0	0	0	0	0	0	0	1	0	0	1	1	0	0	0	0	0	0	2						
	%	0%	0%	0%	0%	0%	0%	0%	0%	0%	0%	0%	0%	0%	0%	0%	0%	0%	0%	0%	0%	0%	0%	0%	0%	0%	0%	0%	0%			
	<b>Total</b>	<b>18</b>	<b>1289</b>	<b>1</b>	<b>32</b>	<b>1340</b>	<b>2313</b>	<b>10</b>	<b>3</b>	<b>18</b>	<b>0</b>	<b>31</b>	<b>20</b>	<b>17</b>	<b>2234</b>	<b>151</b>	<b>23</b>	<b>2425</b>	<b>1353</b>	<b>23</b>	<b>2</b>	<b>37</b>	<b>0</b>	<b>62</b>	<b>172</b>	<b>3858</b>						
	PHF	0.5	0.95	0.25	0.73	0.97	0.97	0.62	0.38	0.56	0	0.65	0.71	0.85	0.97	0.82	0.72	0.96	0.96	0.52	0.5	0.84	0	0.74	0.8	0.96						
	Approach %					35%	60%					1%	1%							63%	35%					2%	4%					

**Study Name** Lynn - Route 1A/Lynnfield at Marine Boulevard and Shepard Street TM3 TMC  
**Start Date** Thursday, May 28, 2015 7:00 AM  
**End Date** Saturday, May 30, 2015 2:00 PM  
**Site Code**

## Report Summary

Time Period	Class.	Southbound						Westbound						Northbound						Eastbound						Crosswalk				
		R	T	L	U	I	O	R	T	L	U	I	O	R	T	L	U	I	O	R	T	L	U	I	O	Total	Pedestrians	Total		
<b>Peak 1</b>	Motorcycles	0	15	0	0	15	12	0	0	0	0	0	0	0	12	1	0	13	15	0	0	0	0	0	1	28	N	0	0	
Specified Period	%	0%	1%	0%	0%	1%	1%	0%	0%	0%	0%	0%	0%	0%	1%	1%	0%	1%	1%	0%	0%	0%	0%	0%	1%	1%	0%	0%	0%	
12:00 PM - 2:00 PM	Cars	45	1264	0	54	1363	1500	1	6	2	0	9	4	4	1409	98	20	1531	1315	29	0	36	1	66	150	2969	E	2	2	
One Hour Peak	%	92%	90%	0%	100%	91%	91%	33%	100%	67%	0%	75%	100%	100%	90%	84%	95%	90%	90%	94%	0%	100%	100%	97%	87%	90%	100%	100%	100%	100%
12:15 PM - 1:15 PM	Light Goods Vehicles	3	97	0	0	100	97	1	0	0	0	1	0	0	96	16	1	113	100	2	0	0	0	0	2	19	S	1	1	
	%	6%	7%	0%	0%	7%	6%	33%	0%	0%	0%	8%	0%	0%	6%	14%	5%	7%	6%	0%	0%	0%	0%	0%	3%	11%	7%	100%	100%	100%
	Buses	0	7	0	0	7	18	0	0	0	0	0	0	0	18	0	0	18	7	0	0	0	0	0	0	25	W	4	4	
	%	0%	0%	0%	0%	0%	1%	0%	0%	0%	0%	0%	0%	0%	1%	0%	0%	1%	0%	0%	0%	0%	0%	0%	0%	1%	100%	100%	100%	100%
	Single-Unit Trucks	1	19	0	0	20	13	0	0	1	0	1	0	0	13	1	0	14	20	0	0	0	0	0	0	2	35	7	7	7
	%	2%	1%	0%	0%	1%	1%	0%	0%	33%	0%	8%	0%	0%	1%	1%	0%	1%	1%	0%	0%	0%	0%	0%	0%	1%	1%	1%	1%	1%
	Articulated Trucks	0	1	0	0	1	3	0	0	0	0	0	0	0	3	0	0	3	1	0	0	0	0	0	0	0	4	0	0	4
	%	0%	0%	0%	0%	0%	0%	0%	0%	0%	0%	0%	0%	0%	0%	0%	0%	0%	0%	0%	0%	0%	0%	0%	0%	0%	0%	0%	0%	0%
	Bicycles on Road	0	0	0	0	0	10	1	0	0	0	1	0	0	9	0	0	9	0	0	0	0	0	0	0	0	0	0	0	10
	%	0%	0%	0%	0%	0%	1%	33%	0%	0%	0%	8%	0%	0%	1%	0%	0%	1%	0%	0%	0%	0%	0%	0%	0%	0%	0%	0%	0%	0%
	<b>Total</b>	<b>49</b>	<b>1403</b>	<b>0</b>	<b>54</b>	<b>1506</b>	<b>1653</b>	<b>3</b>	<b>6</b>	<b>3</b>	<b>0</b>	<b>12</b>	<b>4</b>	<b>4</b>	<b>1560</b>	<b>116</b>	<b>21</b>	<b>1701</b>	<b>1458</b>	<b>31</b>	<b>0</b>	<b>36</b>	<b>1</b>	<b>68</b>	<b>172</b>	<b>3287</b>				
	PHF	0.88	0.94	0	0.79	0.95	0.97	0.75	0.5	0.75	0	0.6	0.5	0.5	0.98	0.81	0.66	0.97	0.94	0.6	0	0.64	0.25	0.85	0.86	0.97				
	Approach %							46%	50%																	2%	5%			

**Study Name** Lynn - Route 1A/Lynnway at Kingman Street and Small Smiles Dental Driveway TM4 TMC  
**Start Date** Thursday, May 28, 2015 7:00 AM  
**End Date** Saturday, May 30, 2015 2:00 PM  
**Site Code**

## Report Summary

Time Period	Class.	Southbound						Westbound						Northbound						Eastbound				Pedestrians	Crosswalk Total	
		R	T	L	U	I	O	R	T	L	U	I	O	R	T	L	U	I	O	I	O	Total	Pedestrians	Crosswalk Total		
<b>Peak 1</b>	Motorcycles	0	4	0	0	4	2	0	0	0	0	0	0	0	0	2	0	1	3	5	0	0	7	N	6	6
Specified Period	%	0%	0%	0%	0%	0%	0%	0%	0%	0%	0%	0%	0%	0%	0%	0%	0%	0%	0%	0%	0%	0%	0%	100%		
7:00 AM - 9:00 AM	Cars	136	2060	71	13	2280	830	12	0	23	0	35	107	36	805	27	20	888	2103	0	163	3203	E	4	4	
One Hour Peak	%	92%	93%	95%	76%	93%	83%	40%	0%	55%	0%	47%	92%	88%	84%	87%	83%	84%	92%	0%	90%	89%		100%		
7:30 AM - 8:30 AM	Light Goods Vehicles	11	104	3	3	121	98	0	0	3	0	3	5	2	95	2	3	102	110	0	13	226	S	1	1	
	%	7%	5%	4%	18%	5%	10%	0%	0%	7%	0%	4%	4%	5%	10%	6%	13%	10%	5%	0%	7%	6%		100%		
	Buses	0	23	1	0	24	28	16	2	11	0	29	1	0	12	0	0	12	34	0	2	65	W	15	15	
	%	0%	1%	1%	0%	1%	3%	53%	100%	26%	0%	39%	1%	0%	1%	0%	0%	1%	1%	0%	1%	2%		100%		
	Single-Unit Trucks	1	19	0	1	21	46	1	0	2	0	3	3	3	44	0	0	47	21	0	1	71		26	26	
	%	1%	1%	0%	6%	1%	5%	3%	0%	5%	0%	4%	3%	7%	5%	0%	0%	4%	1%	0%	1%	2%				
	Articulated Trucks	0	10	0	0	10	2	1	0	3	0	4	0	0	1	2	0	3	13	0	2	17				
	%	0%	0%	0%	0%	0%	0%	3%	0%	7%	0%	5%	0%	0%	0%	6%	0%	0%	1%	0%	1%	0%				
	Bicycles on Road	0	3	0	0	3	0	0	0	0	0	0	0	0	0	0	0	0	3	0	0	3				
	%	0%	0%	0%	0%	0%	0%	0%	0%	0%	0%	0%	0%	0%	0%	0%	0%	0%	0%	0%	0%	0%		0%	0%	
	<b>Total</b>	<b>148</b>	<b>2223</b>	<b>75</b>	<b>17</b>	<b>2463</b>	<b>1006</b>	<b>30</b>	<b>2</b>	<b>42</b>	<b>0</b>	<b>74</b>	<b>116</b>	<b>41</b>	<b>959</b>	<b>31</b>	<b>24</b>	<b>1055</b>	<b>2289</b>	<b>0</b>	<b>181</b>	<b>3592</b>				
	PHF	0.9	0.95	0.78	0.71	0.95	0.97	0.75	0.25	0.75	0	0.88	0.83	0.85	0.94	0.6	0.75	0.95	0.95	0	0.84	0.96				
	Approach %					69%	28%					2%	3%						29%	64%	0%	5%				
<b>Peak 2</b>	Motorcycles	0	6	0	0	6	1	1	0	0	0	1	0	0	0	0	0	0	6	0	0	7	N	10	10	
Specified Period	%	0%	0%	0%	0%	0%	0%	1%	0%	0%	0%	0%	0%	0%	0%	0%	0%	0%	0%	0%	0%	0%	0%	100%		
4:00 PM - 6:00 PM	Cars	33	1094	29	22	1178	2115	108	0	94	0	202	44	15	1985	14	39	2053	1227	0	47	3433	E	4	4	
One Hour Peak	%	85%	89%	60%	79%	88%	91%	94%	0%	93%	0%	93%	66%	79%	91%	64%	95%	90%	90%	0%	75%	90%		100%		
4:30 PM - 5:30 PM	Light Goods Vehicles	4	96	2	6	108	183	6	0	4	0	10	2	0	171	4	2	177	102	0	8	295	S	3	3	
	%	10%	8%	4%	21%	8%	8%	5%	0%	4%	0%	5%	3%	0%	8%	18%	5%	8%	7%	0%	13%	8%		100%		
	Buses	0	14	16	0	30	13	0	1	2	0	3	16	0	13	0	0	13	16	0	1	46	W	20	20	
	%	0%	1%	33%	0%	2%	1%	0%	50%	2%	0%	1%	24%	0%	1%	0%	0%	1%	1%	0%	2%	1%		100%		
	Single-Unit Trucks	2	13	0	0	15	22	0	0	0	0	0	1	1	22	3	0	26	13	0	5	41		37	37	
	%	5%	1%	0%	0%	1%	1%	0%	0%	0%	0%	0%	1%	5%	1%	14%	0%	1%	1%	0%	8%	1%				
	Articulated Trucks	0	2	1	0	3	2	0	1	1	0	2	4	3	2	1	0	6	3	0	2	11				
	%	0%	0%	2%	0%	0%	0%	0%	50%	1%	0%	1%	6%	16%	0%	5%	0%	0%	0%	0%	3%	0%				
	Bicycles on Road	0	1	0	0	1	0	0	0	0	0	0	0	0	0	0	0	0	1	0	0	1				
	%	0%	0%	0%	0%	0%	0%	0%	0%	0%	0%	0%	0%	0%	0%	0%	0%	0%	0%	0%	0%	0%	0%	0%	0%	
	<b>Total</b>	<b>39</b>	<b>1226</b>	<b>48</b>	<b>28</b>	<b>1341</b>	<b>2336</b>	<b>115</b>	<b>2</b>	<b>101</b>	<b>0</b>	<b>218</b>	<b>67</b>	<b>19</b>	<b>2193</b>	<b>22</b>	<b>41</b>	<b>2275</b>	<b>1368</b>	<b>0</b>	<b>63</b>	<b>3834</b>				
	PHF	0.7	0.96	0.8	0.78	0.97	0.97	0.61	0.5	0.74	0	0.67	0.8	0.79	0.96	0.69	0.68	0.95	0.97	0	0.79	0.97				
	Approach %					35%	61%					6%	2%						59%	36%	0%	2%				

**Study Name** Lynn - Route 1A/Lynnway at Kingman Street and Small Smiles Dental Driveway TM4 TMC  
**Start Date** Thursday, May 28, 2015 7:00 AM  
**End Date** Saturday, May 30, 2015 2:00 PM  
**Site Code**

## Report Summary

Time Period	Class.	Southbound						Westbound						Northbound						Eastbound			Total	Pedestrians	Crosswalk Total
		R	T	L	U	I	O	R	T	L	U	I	O	R	T	L	U	I	O	I	O	Total			
<b>Peak 1</b>	Motorcycles	0	18	0	0	18	18	0	0	0	0	0	0	0	18	0	1	19	19	0	0	37	N	0	0
Specified Period	%	0%	1%	0%	0%	1%	1%	0%	0%	0%	0%	0%	0%	0%	1%	0%	2%	1%	1%	0%	0%	1%		0%	
12:00 PM - 2:00 PM	Cars	33	1386	11	52	1482	1448	21	0	19	0	40	20	9	1375	11	43	1438	1448	0	44	2960	E	7	7
One Hour Peak	%	89%	92%	79%	95%	92%	90%	81%	0%	70%	0%	75%	80%	82%	90%	85%	84%	90%	92%	0%	88%	91%		100%	
1:00 PM - 2:00 PM	Light Goods Vehicles	2	71	0	3	76	112	1	0	3	0	4	0	0	108	1	7	116	81	0	3	196	S	4	4
	%	5%	5%	0%	5%	5%	7%	4%	0%	11%	0%	8%	0%	0%	7%	8%	14%	7%	5%	0%	6%	6%		100%	
	Buses	0	13	3	0	16	11	4	0	3	0	7	3	0	7	0	0	7	16	0	0	30	W	32	32
	%	0%	1%	21%	0%	1%	1%	15%	0%	11%	0%	13%	12%	0%	0%	0%	0%	0%	1%	0%	0%	1%		100%	
	Single-Unit Trucks	2	14	0	0	16	17	0	0	1	0	1	0	0	17	0	0	17	15	0	2	34		43	43
	%	5%	1%	0%	0%	1%	1%	0%	0%	4%	0%	2%	0%	0%	1%	0%	0%	1%	1%	0%	4%	1%			
	Articulated Trucks	0	1	0	0	1	1	0	0	1	0	1	2	2	1	1	0	4	2	0	1	6			
	%	0%	0%	0%	0%	0%	0%	0%	0%	4%	0%	2%	8%	18%	0%	8%	0%	0%	0%	0%	2%	0%			
	Bicycles on Road	0	0	0	0	0	1	0	0	0	0	0	0	0	1	0	0	1	0	0	0	1			
	%	0%	0%	0%	0%	0%	0%	0%	0%	0%	0%	0%	0%	0%	0%	0%	0%	0%	0%	0%	0%	0%		0%	
	<b>Total</b>	<b>37</b>	<b>1503</b>	<b>14</b>	<b>55</b>	<b>1609</b>	<b>1608</b>	<b>26</b>	<b>0</b>	<b>27</b>	<b>0</b>	<b>53</b>	<b>25</b>	<b>11</b>	<b>1527</b>	<b>13</b>	<b>51</b>	<b>1602</b>	<b>1581</b>	<b>0</b>	<b>50</b>	<b>3264</b>			
	PHF	0.77	0.96	0.88	0.76	0.98	0.95	0.65	0	0.75	0	0.83	0.69	0.55	0.95	0.54	0.67	0.96	0.95	0	0.69	0.97			
	Approach %					49%	49%					2%	1%						49%	48%	0%	2%			

**Study Name** Lynn - Route 1A at Pleasant Street and Broad Street TM5 TMC  
**Start Date** Thursday, May 28, 2015 7:00 AM  
**End Date** Saturday, May 30, 2015 2:00 PM  
**Site Code**

## Report Summary

Time Period	Class.	Southbound					Northbound					Eastbound					Southeastbound					Total	Pedestrians	Crosswalk			
		R	T	U	I	O	T	L	U	I	O	R	L	U	I	O	HR	BR	HL	I	O						
<b>Peak 1</b>	Motorcycles	0	3	0	3	4	4	0	0	4	3	0	0	0	0	0	0	0	0	0	0	7	N	1	1		
Specified Period	%	0%	0%	0%	0%	0%	0%	0%	0%	0%	0%	0%	0%	0%	0%	0%	0%	0%	0%	0%	0%	0%	100%				
7:00 AM - 9:00 AM	Cars	2	1642	0	1644	814	814	0	0	814	2296	103	0	0	103	33	31	551	0	582	0	3143	S	0	0		
One Hour Peak	%	100%	94%	0%	94%	80%	80%	0%	0%	80%	92%	90%	0%	0%	90%	79%	78%	85%	0%	85%	0%	88%		0%			
7:15 AM - 8:15 AM	Light Goods Vehicles	0	83	0	83	120	120	0	0	120	146	8	0	0	8	5	5	55	0	60	0	271	W	22	22		
	%	0%	5%	0%	5%	12%	12%	0%	0%	12%	6%	7%	0%	0%	7%	12%	13%	8%	0%	9%	0%	8%		100%			
	Buses	0	7	0	7	29	29	0	0	29	23	0	0	0	0	1	1	16	0	17	0	53	NW	0	0		
	%	0%	0%	0%	0%	3%	3%	0%	0%	3%	1%	0%	0%	0%	0%	2%	3%	2%	0%	2%	0%	1%		0%			
	Single-Unit Trucks	0	4	0	4	46	46	0	0	46	28	3	0	0	3	2	2	21	0	23	0	76		23	23		
	%	0%	0%	0%	0%	5%	5%	0%	0%	5%	1%	3%	0%	0%	3%	5%	5%	3%	0%	3%	0%	2%					
	Articulated Trucks	0	3	0	3	3	3	0	0	3	6	0	0	0	0	0	0	3	0	3	0	9					
	%	0%	0%	0%	0%	0%	0%	0%	0%	0%	0%	0%	0%	0%	0%	0%	0%	0%	0%	0%	0%	0%	0%	0%			
	Bicycles on Road	0	0	0	0	0	0	0	0	0	2	0	0	0	0	1	1	2	0	3	0	3					
	%	0%	0%	0%	0%	0%	0%	0%	0%	0%	0%	0%	0%	0%	0%	2%	3%	0%	0%	0%	0%	0%	0%	0%			
<b>Total</b>	<b>2</b>	<b>1742</b>	<b>0</b>	<b>1744</b>	<b>1016</b>	<b>1016</b>	<b>0</b>	<b>0</b>	<b>1016</b>	<b>2504</b>	<b>114</b>	<b>0</b>	<b>0</b>	<b>114</b>	<b>42</b>	<b>40</b>	<b>648</b>	<b>0</b>	<b>688</b>	<b>0</b>	<b>3562</b>						
PHF	0.5	0.94	0	0.94	0.95	0.95	0	0	0.95	0.95	0.89	0	0	0.89	0.7	0.71	0.96	0	0.96	0	0.95						
Approach %				49%	29%				29%	70%					3%	1%					19%	0%					
<b>Peak 2</b>	Motorcycles	0	5	0	5	1	1	0	0	1	7	0	0	0	0	0	0	0	0	2	0	2	0	8	N	0	0
Specified Period	%	0%	1%	0%	1%	0%	0%	0%	0%	1%	0%	0%	0%	0%	0%	0%	0%	0%	0%	0%	0%	0%	0%	0%		0%	
4:00 PM - 6:00 PM	Cars	0	678	0	678	2115	2115	0	0	2115	1177	98	0	0	98	27	27	401	0	428	0	3319	S	1	1		
One Hour Peak	%	0%	89%	0%	89%	91%	91%	0%	0%	91%	87%	87%	0%	0%	87%	87%	87%	84%	0%	84%	0%	89%		100%			
4:30 PM - 5:30 PM	Light Goods Vehicles	0	67	0	67	177	177	0	0	177	116	7	0	0	7	4	4	42	0	46	0	297	W	21	21		
	%	0%	9%	0%	9%	8%	8%	0%	0%	8%	9%	6%	0%	0%	6%	13%	13%	9%	0%	9%	0%	8%		100%			
	Buses	0	10	0	10	11	11	0	0	11	32	5	0	0	5	0	0	17	0	17	0	43	NW	0	0		
	%	0%	1%	0%	1%	0%	0%	0%	0%	2%	4%	0%	0%	4%	0%	0%	4%	0%	3%	0%	1%		0%				
	Single-Unit Trucks	0	5	0	5	18	18	0	0	18	20	1	0	0	1	0	0	14	0	14	0	38		22	22		
	%	0%	1%	0%	1%	1%	1%	0%	0%	1%	1%	1%	0%	0%	1%	0%	0%	3%	0%	3%	0%	1%					
	Articulated Trucks	0	0	0	0	2	2	0	0	2	3	0	0	0	0	0	0	3	0	3	0	5					
	%	0%	0%	0%	0%	0%	0%	0%	0%	0%	0%	0%	0%	0%	0%	0%	0%	1%	0%	1%	0%	0%	0%	0%			
	Bicycles on Road	0	0	0	0	0	0	0	0	0	3	2	0	0	2	0	0	1	0	1	0	3					
	%	0%	0%	0%	0%	0%	0%	0%	0%	0%	2%	0%	0%	2%	0%	0%	0%	0%	0%	0%	0%	0%	0%	0%			
<b>Total</b>	<b>0</b>	<b>765</b>	<b>0</b>	<b>765</b>	<b>2324</b>	<b>2324</b>	<b>0</b>	<b>0</b>	<b>2324</b>	<b>1358</b>	<b>113</b>	<b>0</b>	<b>0</b>	<b>113</b>	<b>31</b>	<b>31</b>	<b>480</b>	<b>0</b>	<b>511</b>	<b>0</b>	<b>3713</b>						
PHF	0	0.9	0	0.9	0.95	0.95	0	0	0.95	0.94	0.69	0	0	0.69	0.6	0.6	0.92	0	0.92	0	0.95						
Approach %				21%	63%				63%	37%					3%	1%					14%	0%					

<b>Study Name</b>	Lynn - Route 1A at Pleasant Street and Broad Street TM5 TMC
<b>Start Date</b>	Thursday, May 28, 2015 7:00 AM
<b>End Date</b>	Saturday, May 30, 2015 2:00 PM
<b>Site Code</b>	

## Report Summary

**Study Name** Lynn - Route 1A/Lynnway at Route 1A/Market Street and Lynnway TM6 TMC  
**Start Date** Thursday, May 28, 2015 7:00 AM  
**End Date** Saturday, May 30, 2015 2:00 PM  
**Site Code**

## Report Summary

Time Period	Class.	Southbound					Westbound					Northeastbound					Total	Pedestrians	Total	
		BR	L	U	I	O	R	BL	U	I	O	BR	BL	U	I	O				
<b>Peak 1</b>	Motorcycles	0	0	0	0	1	0	5	0	5	1	1	1	0	2	5	7	N	2	2
Specified Period	%	0%	0%	0%	0%	0%	0%	0%	0%	0%	0%	0%	0%	0%	0%	0%	0%	100%		
7:00 AM - 9:00 AM	Cars	24	132	0	156	515	169	1593	0	1762	631	499	346	1	846	1618	2764	E	2	2
One Hour Peak	%	96%	84%	0%	86%	84%	94%	93%	0%	93%	83%	83%	80%	100%	82%	93%	89%		100%	
7:30 AM - 8:30 AM	Light Goods Vehicles	1	21	0	22	37	7	99	0	106	90	69	30	0	99	100	227	SW	0	0
	%	4%	13%	0%	12%	6%	4%	6%	0%	6%	12%	11%	7%	0%	10%	6%	7%		0%	
	Buses	0	0	0	0	22	1	9	0	10	6	6	21	0	27	9	37		4	4
	%	0%	0%	0%	0%	4%	1%	1%	0%	1%	1%	1%	5%	0%	3%	1%	1%			
	Single-Unit Trucks	0	3	0	3	36	2	3	0	5	29	26	34	0	60	3	68			
	%	0%	2%	0%	2%	6%	1%	0%	0%	0%	4%	4%	8%	0%	6%	0%	2%			
	Articulated Trucks	0	1	0	1	3	0	1	0	1	1	0	3	0	3	1	5			
	%	0%	1%	0%	1%	0%	0%	0%	0%	0%	0%	0%	1%	0%	0%	0%	0%			
	Bicycles on Road	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0			
	%	0%	0%	0%	0%	0%	0%	0%	0%	0%	0%	0%	0%	0%	0%	0%	0%			
	<b>Total</b>	<b>25</b>	<b>157</b>	<b>0</b>	<b>182</b>	<b>614</b>	<b>179</b>	<b>1710</b>	<b>0</b>	<b>1889</b>	<b>758</b>	<b>601</b>	<b>435</b>	<b>1</b>	<b>1037</b>	<b>1736</b>	<b>3108</b>			
	PHF	0.78	0.96	0	0.97	0.88	0.88	0.93	0	0.92	0.93	0.9	0.86	0.25	0.96	0.93	0.96			
	Approach %				6%	20%				61%	24%					33%	56%			
<b>Peak 2</b>	Motorcycles	0	0	0	0	1	0	5	0	5	0	0	1	0	1	5	6	N	9	9
Specified Period	%	0%	0%	0%	0%	0%	0%	1%	0%	1%	0%	0%	0%	0%	0%	1%	0%		100%	
4:00 PM - 6:00 PM	Cars	9	193	0	202	882	147	665	2	814	1569	1374	735	2	2111	676	3127	E	6	6
One Hour Peak	%	75%	90%	0%	89%	91%	91%	89%	100%	89%	91%	91%	91%	100%	91%	88%	90%		100%	
4:30 PM - 5:30 PM	Light Goods Vehicles	1	19	0	20	69	13	68	0	81	147	128	56	0	184	69	285	SW	0	0
	%	8%	9%	0%	9%	7%	8%	9%	0%	9%	9%	8%	7%	0%	8%	9%	8%		0%	
	Buses	2	1	0	3	12	0	7	0	7	2	1	12	0	13	9	23		15	15
	%	17%	0%	0%	1%	1%	0%	1%	0%	1%	0%	0%	1%	0%	1%	1%	1%			
	Single-Unit Trucks	0	1	0	1	9	2	4	0	6	4	3	7	0	10	4	17			
	%	0%	0%	0%	0%	1%	1%	1%	0%	1%	0%	0%	1%	0%	0%	1%	0%			
	Articulated Trucks	0	0	0	0	1	0	0	0	0	0	0	1	0	1	0	1			
	%	0%	0%	0%	0%	0%	0%	0%	0%	0%	0%	0%	0%	0%	0%	0%	0%			
	Bicycles on Road	0	1	0	1	0	0	1	0	1	1	0	0	0	0	1	2			
	%	0%	0%	0%	0%	0%	0%	0%	0%	0%	0%	0%	0%	0%	0%	0%	0%			
	<b>Total</b>	<b>12</b>	<b>215</b>	<b>0</b>	<b>227</b>	<b>974</b>	<b>162</b>	<b>750</b>	<b>2</b>	<b>914</b>	<b>1723</b>	<b>1506</b>	<b>812</b>	<b>2</b>	<b>2320</b>	<b>764</b>	<b>3461</b>			
	PHF	0.5	0.91	0	0.93	0.9	0.78	0.89	0.5	0.87	0.98	0.98	0.88	0.5	0.94	0.9	0.95			
	Approach %				7%	28%				26%	50%				67%	22%				

**Study Name** Lynn - Route 1A/Lynnway at Route 1A/Market Street and Lynnway TM6 TMC  
**Start Date** Thursday, May 28, 2015 7:00 AM  
**End Date** Saturday, May 30, 2015 2:00 PM  
**Site Code**

## Report Summary

		Southbound						Westbound						Northeastbound								Crosswalk	
Time Period	Class.	BR	L	U	I	O	R	BL	U	I	O	BR	BL	U	I	O	Total		Pedestrians	Total			
<b>Peak 1</b>	Motorcycles	0	3	0	3	7	2	9	0	11	12	9	5	0	14	9	28	N	0	0			
Specified Period	%	0%	1%	0%	1%	1%	1%	1%	0%	1%	1%	1%	1%	0%	1%	1%	1%	1%	0%				
12:00 PM - 2:00 PM	Cars	8	281	2	291	751	212	893	2	1107	1197	914	537	7	1458	908	2856	E	9	9			
One Hour Peak	%	80%	94%	100%	94%	91%	95%	92%	100%	93%	93%	93%	89%	88%	91%	92%	92%		100%				
1:00 PM - 2:00 PM	Light Goods Vehicles	1	13	0	14	53	9	60	0	69	67	54	44	0	98	61	181	SW	0	0			
	%	10%	4%	0%	5%	6%	4%	6%	0%	6%	5%	5%	7%	0%	6%	6%	6%		0%				
	Buses	1	0	0	1	10	0	2	0	2	1	1	10	0	11	3	14		9	9			
	%	10%	0%	0%	0%	1%	0%	0%	0%	0%	0%	0%	2%	0%	1%	0%	0%						
	Single-Unit Trucks	0	1	0	1	8	0	6	0	6	5	4	8	1	13	7	20						
	%	0%	0%	0%	0%	1%	0%	1%	0%	1%	0%	0%	1%	13%	1%	1%	1%						
	Articulated Trucks	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0						
	%	0%	0%	0%	0%	0%	0%	0%	0%	0%	0%	0%	0%	0%	0%	0%	0%						
	Bicycles on Road	0	1	0	1	0	0	0	0	0	1	0	0	0	0	0	0	1					
	%	0%	0%	0%	0%	0%	0%	0%	0%	0%	0%	0%	0%	0%	0%	0%	0%						
<b>Total</b>	<b>PHF</b>	<b>10</b>	<b>299</b>	<b>2</b>	<b>311</b>	<b>829</b>	<b>223</b>	<b>970</b>	<b>2</b>	<b>1195</b>	<b>1283</b>	<b>982</b>	<b>604</b>	<b>8</b>	<b>1594</b>	<b>988</b>	<b>3100</b>						
	Approach %				10%	27%				39%	41%					51%	32%						

**Study Name** Lynn - Route 1A/Market Street at Route 1A/Broad Street, Market Street and Broad Street TM7 TMC  
**Start Date** Thursday, May 28, 2015 7:00 AM  
**End Date** Saturday, May 30, 2015 2:00 PM  
**Site Code**

## Report Summary

Time Period	Class.	Southbound						Westbound						Northbound			Southeastbound						Pedestrians	Crosswalk Total	
		HR	T	L	U	I	O	R	BR	L	U	I	O	I	O	BR	BL	HL	U	I	O	Total			
<b>Peak 1</b>	Motorcycles	1	0	0	0	1	3	1	1	0	0	2	1	0	1	1	1	2	0	4	2	7	N	7	7
Specified Period	%	1%	0%	0%	0%	0%	1%	0%	0%	0%	0%	0%	1%	0%	0%	1%	1%	1%	0%	1%	0%	0%		100%	
7:00 AM - 9:00 AM	Cars	151	433	44	0	628	386	256	268	7	1	532	157	0	583	143	112	130	0	385	419	1545	E	3	3
One Hour Peak	%	84%	87%	83%	0%	86%	84%	83%	88%	70%	100%	85%	83%	0%	88%	91%	83%	85%	0%	87%	86%	86%		100%	
7:45 AM - 8:45 AM	Light Goods Vehicles	7	38	7	0	52	31	21	12	1	0	34	26	0	48	9	19	10	0	38	19	124	S	2	2
	%	4%	8%	13%	0%	7%	7%	7%	4%	10%	0%	5%	14%	0%	7%	6%	14%	7%	0%	9%	4%	7%		100%	
	Buses	19	11	0	0	30	10	7	14	0	0	21	0	0	13	2	0	3	0	5	33	56	NW	28	28
	%	11%	2%	0%	0%	4%	2%	2%	5%	0%	0%	3%	0%	0%	2%	1%	0%	2%	0%	1%	7%	3%		100%	
	Single-Unit Trucks	2	14	1	0	17	28	20	10	2	0	32	4	0	17	1	3	8	0	12	12	61		40	40
	%	1%	3%	2%	0%	2%	6%	7%	3%	20%	0%	5%	2%	0%	3%	1%	2%	5%	0%	3%	2%	3%			
	Articulated Trucks	0	3	1	0	4	2	2	0	0	0	2	1	0	4	1	0	0	0	1	0	7			
	%	0%	1%	2%	0%	1%	0%	1%	0%	0%	0%	1%	0%	1%	1%	0%	0%	0%	0%	0%	0%	0%			
	Bicycles on Road	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0			
	%	0%	0%	0%	0%	0%	0%	0%	0%	0%	0%	0%	0%	0%	0%	0%	0%	0%	0%	0%	0%	0%			
	<b>Total</b>	<b>180</b>	<b>499</b>	<b>53</b>	<b>0</b>	<b>732</b>	<b>460</b>	<b>307</b>	<b>305</b>	<b>10</b>	<b>1</b>	<b>623</b>	<b>189</b>	<b>0</b>	<b>666</b>	<b>157</b>	<b>135</b>	<b>153</b>	<b>0</b>	<b>445</b>	<b>485</b>	<b>1800</b>			
	PHF	0.85	0.85	0.7	0	0.88	0.83	0.91	0.84	0.62	0.25	0.92	0.86	0	0.85	0.82	0.75	0.63	0	0.78	0.93	0.95			
	Approach %					41%	26%					35%	11%	0%	37%						25%	27%			
<b>Peak 2</b>	Motorcycles	0	1	0	0	1	3	1	0	0	0	1	1	0	2	1	1	2	0	4	0	6	N	20	20
Specified Period	%	0%	0%	0%	0%	0%	0%	0%	0%	0%	0%	0%	0%	0%	0%	1%	1%	1%	0%	1%	0%	0%		100%	
4:00 PM - 6:00 PM	Cars	183	282	43	0	508	768	506	346	13	2	867	194	0	427	132	149	262	0	543	529	1918	E	4	4
One Hour Peak	%	90%	85%	91%	0%	87%	91%	91%	88%	100%	67%	90%	86%	0%	85%	84%	85%	91%	0%	87%	88%	88%		100%	
4:30 PM - 5:30 PM	Light Goods Vehicles	8	25	4	0	37	52	36	30	0	1	67	23	0	43	18	18	16	0	52	38	156	S	5	5
	%	4%	8%	9%	0%	6%	6%	6%	8%	0%	33%	7%	10%	0%	9%	11%	10%	6%	0%	8%	6%	7%		100%	
	Buses	10	11	0	0	21	3	3	9	0	0	12	3	0	16	5	3	0	0	8	19	41	NW	31	31
	%	5%	3%	0%	0%	4%	0%	1%	2%	0%	0%	1%	1%	0%	3%	3%	2%	0%	0%	1%	3%	2%		100%	
	Single-Unit Trucks	2	13	0	0	15	15	7	8	0	0	15	3	0	14	1	3	8	0	12	10	42		60	60
	%	1%	4%	0%	0%	3%	2%	1%	2%	0%	0%	2%	1%	0%	3%	1%	2%	3%	0%	2%	2%	2%			
	Articulated Trucks	1	1	0	0	2	1	1	1	0	0	2	0	0	2	1	0	0	0	1	2	5			
	%	0%	0%	0%	0%	0%	0%	0%	0%	0%	0%	0%	0%	0%	0%	1%	0%	0%	0%	0%	0%	0%			
	Bicycles on Road	0	0	0	0	0	1	0	0	0	0	0	1	0	0	0	1	1	0	2	0	2			
	%	0%	0%	0%	0%	0%	0%	0%	0%	0%	0%	0%	0%	0%	0%	1%	0%	0%	0%	0%	0%	0%			
	<b>Total</b>	<b>204</b>	<b>333</b>	<b>47</b>	<b>0</b>	<b>584</b>	<b>843</b>	<b>554</b>	<b>394</b>	<b>13</b>	<b>3</b>	<b>964</b>	<b>225</b>	<b>0</b>	<b>504</b>	<b>158</b>	<b>175</b>	<b>289</b>	<b>0</b>	<b>622</b>	<b>598</b>	<b>2170</b>			
	PHF	0.81	0.82	0.69	0	0.85	0.89	0.92	0.93	0.81	0.38	0.93	0.95	0	0.91	0.84	0.89	0.83	0	0.93	0.93	0.92			
	Approach %					27%	39%					44%	10%	0%	23%						29%	28%			

**Study Name** Lynn - Route 1A/Market Street at Route 1A/Broad Street, Market Street and Broad Street TM7 TMC  
**Start Date** Thursday, May 28, 2015 7:00 AM  
**End Date** Saturday, May 30, 2015 2:00 PM  
**Site Code**

## Report Summary

Time Period	Class.	Southbound						Westbound						Northbound			Southeastbound						Total	Pedestrians	Crosswalk Total
		HR	T	L	U	I	O	R	BR	L	U	I	O	I	O	BR	BL	HL	U	I	O	Total			
<b>Peak 1</b>	Motorcycles	2	2	1	0	5	5	3	5	1	1	10	3	0	7	4	1	2	0	7	7	22	N	8	8
Specified Period	%	1%	0%	1%	0%	1%	1%	1%	1%	8%	8%	1%	1%	0%	1%	3%	0%	1%	0%	1%	1%	1%		100%	
12:00 PM - 2:00 PM	Cars	150	366	68	0	584	523	335	331	9	9	684	290	0	510	135	213	188	0	536	481	1804	E	7	7
One Hour Peak	%	87%	90%	91%	0%	89%	89%	88%	89%	69%	75%	88%	91%	0%	89%	88%	92%	92%	0%	91%	88%	89%		100%	
12:30 PM - 1:30 PM	Light Goods Vehicles	9	22	5	0	36	43	32	27	1	2	62	20	0	30	7	13	11	0	31	36	129	S	1	1
	%	5%	5%	7%	0%	6%	7%	8%	7%	8%	17%	8%	6%	0%	5%	5%	6%	5%	0%	5%	7%	6%		100%	
	Buses	9	9	1	0	19	4	3	8	0	0	11	2	0	14	5	1	1	0	7	17	37	NW	16	16
	%	5%	2%	1%	0%	3%	1%	1%	2%	0%	0%	1%	1%	0%	2%	3%	0%	0%	0%	1%	3%	2%		100%	
	Single-Unit Trucks	2	6	0	0	8	9	6	1	2	0	9	2	0	10	2	2	3	0	7	3	24		32	32
	%	1%	1%	0%	0%	1%	2%	2%	0%	15%	0%	1%	1%	0%	2%	1%	1%	1%	0%	1%	1%	1%			
	Articulated Trucks	0	1	0	0	1	1	1	0	0	0	1	0	0	1	0	0	0	0	0	0	0		2	
	%	0%	0%	0%	0%	0%	0%	0%	0%	0%	0%	0%	0%	0%	0%	0%	0%	0%	0%	0%	0%	0%		0%	
	Bicycles on Road	0	1	0	0	1	0	0	2	0	0	2	1	0	1	0	1	0	0	1	2	4			
	%	0%	0%	0%	0%	0%	0%	0%	1%	0%	0%	0%	0%	0%	0%	0%	0%	0%	0%	0%	0%	0%		0%	
	<b>Total</b>	<b>172</b>	<b>407</b>	<b>75</b>	<b>0</b>	<b>654</b>	<b>585</b>	<b>380</b>	<b>374</b>	<b>13</b>	<b>12</b>	<b>779</b>	<b>318</b>	<b>0</b>	<b>573</b>	<b>153</b>	<b>231</b>	<b>205</b>	<b>0</b>	<b>589</b>	<b>546</b>	<b>2022</b>			
	PHF	0.77	0.81	0.78	0	0.82	0.91	0.96	0.88	0.54	0.5	0.91	0.85	0	0.88	0.81	0.76	0.84	0	0.8	0.9	0.97			
	Approach %					32%	29%					39%	16%	0%	28%						29%	27%			

**Study Name** Lynnway Roundabout - North side TMC  
**Start Date** Thursday, May 28, 2015 7:00 AM  
**End Date** Saturday, May 30, 2015 2:00 PM  
**Site Code**

## Report Summary

		Southbound					Westbound					Northbound			Eastbound							Crosswalk	
Time Period	Class.	R	T	U	I	O	R	T	L	I	O	I	O	R	L	U	I	O	Total	Pedestrians	Total		
<b>Peak 1</b>	Motorcycles	3	0	0	3	3	3	0	0	3	0	0	2	2	0	0	2	3	8	N	8	8	
Specified Period	%	0%	0%	0%	0%	0%	0%	0%	0%	0%	0%	0%	0%	0%	0%	0%	0%	0%			100%		
7:00 AM - 9:00 AM	Cars	1324	44	0	1368	638	638	312	1	951	0	0	614	569	0	0	569	1636	2888	E	0	0	
One Hour Peak	%	94%	65%	0%	93%	83%	83%	87%	50%	84%	0%	0%	79%	80%	0%	0%	80%	93%	87%			0%	
7:00 AM - 8:00 AM	Light Goods Vehicles	65	16	0	81	100	100	39	1	140	0	0	126	109	0	0	109	104	330	S	0	0	
	%	5%	24%	0%	6%	13%	13%	11%	50%	12%	0%	0%	16%	15%	0%	0%	15%	6%	10%			0%	
	Buses	2	1	0	3	12	12	2	0	14	0	0	11	10	0	0	10	4	27	W	0	0	
	%	0%	1%	0%	0%	2%	2%	1%	0%	1%	0%	0%	1%	1%	0%	0%	1%	0%	1%			0%	
	Single-Unit Trucks	2	5	0	7	12	12	7	0	19	0	0	26	21	0	0	21	9	47		8	8	
	%	0%	7%	0%	0%	2%	2%	2%	0%	2%	0%	0%	3%	3%	0%	0%	3%	1%	1%				
	Articulated Trucks	3	0	0	3	1	1	0	0	1	0	0	1	1	0	0	1	3	5				
	%	0%	0%	0%	0%	0%	0%	0%	0%	0%	0%	0%	0%	0%	0%	0%	0%	0%	0%				
	Bicycles on Road	3	2	0	5	1	1	0	0	1	0	0	2	0	0	0	0	3	6				
	%	0%	3%	0%	0%	0%	0%	0%	0%	0%	0%	0%	0%	0%	0%	0%	0%	0%	0%				
	<b>Total</b>	<b>1402</b>	<b>68</b>	<b>0</b>	<b>1470</b>	<b>767</b>	<b>767</b>	<b>360</b>	<b>2</b>	<b>1129</b>	<b>0</b>	<b>0</b>	<b>782</b>	<b>712</b>	<b>0</b>	<b>0</b>	<b>712</b>	<b>1762</b>	<b>3311</b>				
	PHF	0.98	0.89	0	0.99	0.9	0.9	0.94	0.5	0.93	0	0	0.93	0.91	0	0	0.91	0.98	0.96				
	Approach %				44%	23%				34%	0%	0%	24%						22%	53%			
<b>Peak 2</b>	Motorcycles	3	4	0	7	1	1	2	0	3	0	0	5	1	0	0	1	5	11	N	29	29	
Specified Period	%	1%	2%	0%	1%	0%	0%	1%	0%	0%	0%	0%	0%	0%	0%	0%	0%	1%	0%			100%	
4:00 PM - 6:00 PM	Cars	522	171	0	693	1197	1197	311	6	1514	0	0	1622	1445	0	0	1445	833	3652	E	0	0	
One Hour Peak	%	87%	85%	0%	87%	92%	92%	84%	86%	90%	0%	0%	89%	90%	0%	0%	90%	86%	89%			0%	
4:15 PM - 5:15 PM	Light Goods Vehicles	62	25	0	87	90	90	43	1	134	0	0	169	143	0	0	143	105	364	S	0	0	
	%	10%	12%	0%	11%	7%	7%	12%	14%	8%	0%	0%	9%	9%	0%	0%	9%	11%	9%			0%	
	Buses	1	0	0	1	3	3	1	0	4	0	0	4	4	0	0	4	2	9	W	8	8	
	%	0%	0%	0%	0%	0%	0%	0%	0%	0%	0%	0%	0%	0%	0%	0%	0%	0%	0%			100%	
	Single-Unit Trucks	8	2	0	10	9	9	12	0	21	0	0	14	12	0	0	12	20	43		37	37	
	%	1%	1%	0%	1%	1%	1%	3%	0%	1%	0%	0%	1%	1%	0%	0%	1%	2%	1%				
	Articulated Trucks	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0				
	%	0%	0%	0%	0%	0%	0%	0%	0%	0%	0%	0%	0%	0%	0%	0%	0%	0%	0%				
	Bicycles on Road	2	0	0	2	0	0	0	0	0	0	0	0	0	0	0	0	0	2				
	%	0%	0%	0%	0%	0%	0%	0%	0%	0%	0%	0%	0%	0%	0%	0%	0%	0%	0%				
	<b>Total</b>	<b>598</b>	<b>202</b>	<b>0</b>	<b>800</b>	<b>1300</b>	<b>1300</b>	<b>369</b>	<b>7</b>	<b>1676</b>	<b>0</b>	<b>0</b>	<b>1814</b>	<b>1605</b>	<b>0</b>	<b>0</b>	<b>1605</b>	<b>967</b>	<b>4081</b>				
	PHF	0.87	0.86	0	0.95	0.95	0.95	0.9	0.58	0.97	0	0	0.93	0.93	0	0	0.93	0.89	0.96				
	Approach %				20%	32%				41%	0%	0%	44%						39%	24%			

<b>Study Name</b>	Lynnway Roundabout - North side TMC
<b>Start Date</b>	Thursday, May 28, 2015 7:00 AM
<b>End Date</b>	Saturday, May 30, 2015 2:00 PM
<b>Site Code</b>	

## Report Summary

**Study Name** Lynnway Roundabout - South side TMC  
**Start Date** Thursday, May 28, 2015 7:00 AM  
**End Date** Saturday, May 30, 2015 2:00 PM  
**Site Code**

## Report Summary

		Westbound		Northbound			Eastbound						Crosswalk	
Time Period	Class.	I	O	R	U	I	O	R	T	I	O	Total	Pedestrians	Total
<b>Peak 1</b>	Motorcycles	0	1	1	0	1	1	1	0	1	0	2	E	0
Specified Period	%	0%	0%	0%	0%	0%	1%	1%	0%	0%	0%	0%		0%
7:00 AM - 9:00 AM	Cars	0	1038	450	0	450	132	132	588	720	0	1170	S	1
One Hour Peak	%	0%	89%	90%	0%	90%	68%	68%	89%	84%	0%	86%		100%
7:30 AM - 8:30 AM	Light Goods Vehicles	0	96	35	0	35	40	40	61	101	0	136	W	0
	%	0%	8%	7%	0%	7%	21%	21%	9%	12%	0%	10%		0%
	Buses	0	8	2	0	2	1	1	6	7	0	9		1
	%	0%	1%	0%	0%	0%	1%	1%	1%	1%	0%	1%		
	Single-Unit Trucks	0	15	9	0	9	16	16	6	22	0	31		
	%	0%	1%	2%	0%	2%	8%	8%	1%	3%	0%	2%		
	Articulated Trucks	0	0	0	0	0	2	2	0	2	0	2		
	%	0%	0%	0%	0%	0%	1%	1%	0%	0%	0%	0%		
	Bicycles on Road	0	2	2	0	2	2	2	0	2	0	4		
	%	0%	0%	0%	0%	0%	1%	1%	0%	0%	0%	0%		
	<b>Total</b>	<b>0</b>	<b>1160</b>	<b>499</b>	<b>0</b>	<b>499</b>	<b>194</b>	<b>194</b>	<b>661</b>	<b>855</b>	<b>0</b>	<b>1354</b>		
	PHF	0	0.94	0.85	0	0.85	0.85	0.85	0.95	0.98	0	0.96		
	Approach %	0%	86%			37%	14%			63%	0%			
<b>Peak 2</b>	Motorcycles	0	4	2	0	2	5	5	2	7	0	9	E	2
Specified Period	%	0%	0%	1%	0%	1%	1%	1%	0%	0%	0%	0%		100%
4:00 PM - 6:00 PM	Cars	0	1558	352	0	352	425	425	1206	1631	0	1983	S	4
One Hour Peak	%	0%	94%	91%	0%	91%	83%	83%	95%	91%	0%	91%		100%
5:00 PM - 6:00 PM	Light Goods Vehicles	0	90	27	0	27	73	73	63	136	0	163	W	0
	%	0%	5%	7%	0%	7%	14%	14%	5%	8%	0%	8%		0%
	Buses	0	0	0	0	0	1	1	0	1	0	1		6
	%	0%	0%	0%	0%	0%	0%	0%	0%	0%	0%	0%		
	Single-Unit Trucks	0	8	6	0	6	6	6	2	8	0	14		
	%	0%	0%	2%	0%	2%	1%	1%	0%	0%	0%	1%		
	Articulated Trucks	0	3	0	0	0	0	0	3	3	0	3		
	%	0%	0%	0%	0%	0%	0%	0%	0%	0%	0%	0%		
	Bicycles on Road	0	0	0	0	0	0	0	0	0	0	0		
	%	0%	0%	0%	0%	0%	0%	0%	0%	0%	0%	0%		
	<b>Total</b>	<b>0</b>	<b>1663</b>	<b>387</b>	<b>0</b>	<b>387</b>	<b>510</b>	<b>510</b>	<b>1276</b>	<b>1786</b>	<b>0</b>	<b>2173</b>		
	PHF	0	0.91	0.86	0	0.86	0.98	0.98	0.92	0.95	0	0.93		
	Approach %	0%	77%			18%	23%			82%	0%			

**Study Name** Lynnway Roundabout - South side TMC  
**Start Date** Thursday, May 28, 2015 7:00 AM  
**End Date** Saturday, May 30, 2015 2:00 PM  
**Site Code**

## Report Summary

		Westbound			Northbound			Eastbound					Crosswalk		
Time Period	Class.	I	O	R	U	I	O	R	T	I	O	Total		Pedestrians	Total
<b>Peak 1</b>	Motorcycles	0	20	14	0	14	10	10	6	16	0	30	E	0	0
Specified Period	%	0%	1%	2%	0%	2%	1%	1%	1%	1%	0%	1%		0%	
12:00 PM - 2:00 PM	Cars	0	1532	750	0	750	829	829	782	1611	0	2361	S	6	6
One Hour Peak	%	0%	93%	91%	0%	91%	91%	91%	95%	93%	0%	92%		100%	
12:00 PM - 1:00 PM	Light Goods Vehicles	0	72	50	0	50	71	71	22	93	0	143	W	0	0
	%	0%	4%	6%	0%	6%	8%	8%	3%	5%	0%	6%		0%	
	Buses	0	2	0	0	0	0	0	2	2	0	2		6	6
	%	0%	0%	0%	0%	0%	0%	0%	0%	0%	0%	0%			
	Single-Unit Trucks	0	15	5	0	5	3	3	10	13	0	18			
	%	0%	1%	1%	0%	1%	0%	0%	1%	1%	0%	1%			
	Articulated Trucks	0	1	0	0	0	0	0	1	1	0	1			
	%	0%	0%	0%	0%	0%	0%	0%	0%	0%	0%	0%			
	Bicycles on Road	0	7	7	0	7	3	3	0	3	0	10			
	%	0%	0%	1%	0%	1%	0%	0%	0%	0%	0%	0%			
	<b>Total</b>	<b>0</b>	<b>1649</b>	<b>826</b>	<b>0</b>	<b>826</b>	<b>916</b>	<b>916</b>	<b>823</b>	<b>1739</b>	<b>0</b>	<b>2565</b>			
	PHF	0	0.91	0.84	0	0.84	0.91	0.91	0.94	0.96	0	0.94			
	Approach %	0%	64%		32%	36%			68%	0%					



## **Spot Speed Data**

# SPEED

MassDOT Highway Division  
SPEED SUMMARY  
Mon 6/1/2015

Page: 1

STA. 1 NB

Site Reference: 150140000402  
Site ID: 110000000101  
Location: RTE. 1A/LYNNWAY, SOUTH OF HANSON ST.  
Direction: ROAD TOTAL

File: SPDC-101.prn  
City: LYNN  
County: SPEED LN-1&2 NB

TIME	10	15	20	25	30	35	40	45	50	55	60	65	70	71+	Total
01:00	1	0	1	0	5	30	67	81	40	17	0	0	0	0	242
02:00	1	0	1	0	6	24	60	40	17	13	2	0	0	0	164
03:00	0	0	0	1	4	19	34	37	15	3	0	1	0	0	114
04:00	0	0	0	1	1	17	28	23	6	4	2	0	0	0	82
05:00	0	0	0	0	2	20	32	32	28	9	0	0	0	0	123
06:00	0	0	0	1	7	25	78	88	68	23	5	0	0	0	295
07:00	3	0	0	0	9	104	194	194	82	28	8	0	0	0	622
08:00	4	2	0	3	33	178	334	199	82	17	3	1	0	0	856
09:00	2	1	8	7	75	208	332	152	71	10	1	0	1	0	868
10:00	2	0	3	17	54	190	267	158	81	8	6	1	1	0	788
11:00	1	0	0	7	71	223	303	194	72	9	1	0	0	0	881
12:00	0	2	2	30	135	321	264	114	27	6	0	0	0	0	901
13:00	110	50	55	79	125	241	173	77	23	2	2	0	0	0	937
14:00	18	0	12	30	97	244	398	209	67	22	2	0	0	0	1099
15:00	3	0	4	10	77	356	477	223	56	15	1	0	0	0	1222
16:00	19	9	19	34	158	484	515	245	73	15	2	0	0	0	1573
17:00	69	40	101	143	223	521	440	146	31	3	0	2	0	1	1720
18:00	193	129	317	340	238	284	132	29	9	2	0	0	0	2	1675
19:00	100	89	237	245	282	395	309	107	16	3	1	0	0	0	1784
20:00	6	0	4	13	142	503	464	192	56	14	2	0	1	2	1399
21:00	0	0	0	0	62	225	310	164	41	9	0	0	0	0	811
22:00	0	0	0	1	40	163	254	158	50	5	1	0	0	0	672
23:00	1	0	1	5	23	125	183	104	48	7	2	0	0	0	499
24:00	1	0	0	1	7	66	138	116	40	9	1	0	0	1	380

DAY TOTAL	534	322	765	968	1876	4966	5786	3082	1099	253	42	5	3	6	19707
PERCENTS	2.8%	1.7%	3.9%	5.0%	9.6%	25.2%	29.3%	15.6%	5.5%	1.2%	0.2%	0.0%	0.0%	0.0%	100%

#### Statistical Information...

15th Percentile Speed  
26.0 mph

85th Percentile Speed  
42.5 mph

Median Speed  
35.4 mph

Average Speed  
34.1 mph

10 MPH Pace Speed  
30 mph to 40 mph  
10752 vehicles in pace  
Representing 54.5% of the total vehicles

Vehicles > 65 MPH  
9  
0.0%

MassDOT Highway Division  
 SPEED SUMMARY  
 Tue 6/2/2015

Page: 2

Site Reference: 150140000402

Site ID: 110000000101

Location: RTE. 1A/LYNWAY, SOUTH OF HANSON ST.

Direction: ROAD TOTAL

File: SPDC-101.prn

City: LYNN

County: SPEED LN-1&2 NB

TIME	10	15	20	25	30	35	40	45	50	55	60	65	70	71+	Total
01:00	0	0	0	2	12	46	97	66	24	10	0	0	0	0	257
02:00	0	0	0	0	4	22	54	42	17	2	0	0	0	0	141
03:00	2	0	0	4	4	18	35	27	7	3	0	0	0	0	100
04:00	0	0	0	0	3	11	22	20	6	4	2	0	0	0	68
05:00	2	0	0	0	2	22	48	30	18	6	1	0	0	0	129
06:00	2	2	1	2	5	34	80	88	48	19	4	1	0	0	286
07:00	0	1	0	1	7	67	183	171	95	39	6	0	0	0	570
08:00	5	1	5	13	37	161	350	213	79	9	3	1	0	0	877
09:00	6	1	2	2	40	228	313	229	84	22	4	0	0	0	931
10:00	4	0	1	10	38	139	275	193	80	23	4	2	0	0	769
11:00	8	2	6	2	36	189	325	200	77	14	4	0	0	0	863
12:00	8	4	2	4	62	235	309	211	80	10	1	0	0	0	926
13:00	3	3	3	14	76	238	346	192	72	17	1	0	0	0	965
14:00	3	0	6	21	57	308	430	229	86	13	2	0	0	2	1157
15:00	8	1	5	21	81	292	442	244	90	18	2	1	0	0	1205
16:00	5	2	22	76	238	432	484	227	92	28	5	0	0	1	1612
17:00	20	13	27	87	289	528	510	222	59	5	1	0	0	0	1761
18:00	53	29	69	153	311	553	577	195	38	7	0	0	0	0	1985
19:00	32	13	84	166	352	536	429	204	70	11	0	0	0	0	1897
20:00	6	0	4	6	43	241	443	346	135	36	4	0	0	0	1264
21:00	4	2	3	0	19	126	331	262	125	19	2	2	0	0	895
22:00	1	0	2	4	12	119	296	205	108	24	4	0	0	1	776
23:00	1	0	1	1	13	88	207	208	107	32	3	0	0	0	661
24:00	0	0	0	0	7	45	126	131	82	30	11	0	0	0	432

DAY TOTAL	173	74	243	589	1748	4678	6712	4155	1679	401	64	7	0	4	20527
PERCENTS	0.9%	0.4%	1.2%	2.9%	8.6%	22.8%	32.7%	20.2%	8.1%	1.9%	0.3%	0.0%	0.0%	0.0%	100%

#### Statistical Information...

15th Percentile Speed  
 30.3 mph

85th Percentile Speed  
 43.9 mph

Median Speed  
 37.1 mph

Average Speed  
 36.7 mph

10 MPH Pace Speed  
 30 mph to 40 mph  
 11390 vehicles in pace  
 Representing 55.4% of the total vehicles

Vehicles > 65 MPH  
 4  
 0.0%

MassDOT Highway Division  
 SPEED SUMMARY  
 Wed 6/3/2015

Page: 3

Site Reference: 150140000402

Site ID: 110000000101

Location: RTE. 1A/LYNNWAY, SOUTH OF HANSON ST.

Direction: ROAD TOTAL

File: SPDC-101.prn

City: LYNN

County: SPEED LN-1&2 NB

TIME	10	15	20	25	30	35	40	45	50	55	60	65	70	71+	Total
01:00	0	0	0	0	5	30	67	90	44	15	3	1	0	0	255
02:00	0	1	0	0	3	15	38	37	25	11	1	0	0	0	131
03:00	0	0	0	0	6	12	26	30	13	6	1	0	0	0	94
04:00	0	0	0	0	1	8	28	18	14	3	0	0	0	0	72
05:00	0	0	0	1	5	13	19	34	17	5	3	1	0	0	98
06:00	0	1	0	1	0	17	61	79	68	59	22	4	0	0	312
07:00	3	1	0	5	7	40	158	178	145	76	22	3	0	0	638
08:00	4	2	11	13	37	116	286	255	122	46	9	1	0	0	902
09:00	5	1	9	4	23	183	306	232	125	35	11	2	0	2	938
10:00	7	0	5	10	26	125	277	221	133	40	3	1	0	1	849
11:00	5	1	4	14	55	218	269	199	113	25	5	2	0	2	912
12:00	11	1	5	16	72	216	297	239	84	19	3	1	0	0	964
13:00	8	0	6	15	27	214	380	260	98	29	5	0	0	0	1042
14:00	3	1	5	10	49	221	424	241	88	25	3	1	0	2	1073
15:00	18	2	14	22	52	228	457	288	137	37	5	0	0	0	1260
16:00	21	8	37	55	160	465	514	279	97	18	4	0	0	5	1663
17:00	33	28	89	122	262	512	459	231	60	6	1	0	0	2	1805
18:00	48	15	78	163	402	669	464	168	39	4	0	0	0	2	2052
19:00	30	16	60	100	259	550	514	258	78	8	2	1	0	2	1878
20:00	17	1	7	30	65	304	550	310	124	31	6	0	0	0	1445
21:00	4	2	4	13	44	205	388	248	86	20	8	1	0	0	1023
22:00	6	0	2	2	22	173	320	310	94	18	0	0	0	0	947
23:00	7	0	2	5	12	99	268	197	97	17	3	2	0	0	709
24:00	1	0	1	0	7	29	178	184	85	29	4	0	0	2	520

DAY TOTAL	231	81	339	601	1601	4662	6748	4586	1986	582	124	21	0	20	21582
PERCENTS	1.1%	0.4%	1.6%	2.8%	7.5%	21.7%	31.3%	21.3%	9.2%	2.6%	0.5%	0.0%	0.0%	0.0%	100%

#### Statistical Information...

15th Percentile Speed  
 30.4 mph

Median Speed  
 37.4 mph

10 MPH Pace Speed  
 30 mph to 40 mph  
 11410 vehicles in pace  
 Representing 52.8% of the total vehicles

85th Percentile Speed  
 44.5 mph

Average Speed  
 37.0 mph

Vehicles > 65 MPH  
 20  
 0.1%

MassDOT Highway Division  
 SPEED SUMMARY  
 Thu 6/4/2015

Page: 4

Site Reference: 150140000402

Site ID: 110000000101

Location: RTE. 1A/LYNWAY, SOUTH OF HANSON ST.

Direction: ROAD TOTAL

File: SPDC-101.prn

City: LYNN

County: SPEED LN-1&2 NB

TIME	10	15	20	25	30	35	40	45	50	55	60	65	70	71+	Total
01:00	0	1	1	4	5	36	89	94	55	18	6	1	0	2	312
02:00	0	0	0	1	2	19	45	61	24	20	5	0	0	1	178
03:00	0	0	0	0	5	9	37	34	20	7	1	2	0	0	115
04:00	0	0	1	2	2	11	20	26	11	7	2	0	0	0	82
05:00	0	0	0	2	2	12	34	39	18	12	1	0	0	0	120
06:00	0	0	2	3	2	17	71	86	85	38	15	6	1	0	326
07:00	4	0	0	5	5	40	128	212	148	72	23	0	0	0	637
08:00	9	2	2	6	19	116	266	302	186	67	16	0	1	3	995
09:00	8	0	10	6	20	132	309	243	134	39	10	1	0	0	912
10:00	7	2	8	9	39	169	243	211	107	31	3	2	0	0	831
11:00	5	1	12	6	38	213	343	181	127	28	4	2	0	0	960
12:00	7	0	12	7	42	204	291	208	113	25	2	1	0	0	912
13:00	18	3	15	24	58	240	389	223	106	19	5	1	1	6	1108
14:00	26	3	21	11	38	271	446	219	88	21	5	2	0	4	1155
15:00	21	5	26	12	56	273	472	267	119	40	2	0	2	8	1303
16:00	34	5	41	43	174	488	512	236	103	22	4	0	0	5	1667
17:00	143	136	252	250	167	242	261	129	41	4	0	0	0	8	1633

DAY TOTAL	282	158	403	391	674	2492	3956	2771	1485	470	104	.18	5	37	13246
PERCENTS	2.2%	1.2%	3.1%	3.0%	5.1%	18.9%	29.9%	20.9%	11.2%	3.5%	0.7%	0.1%	0.0%	0.2%	100%

Statistical Information...

15th Percentile Speed  
 30.2 mph

85th Percentile Speed  
 45.5 mph

Median Speed  
 37.8 mph

Average Speed  
 36.9 mph

10 MPH Pace Speed  
 35 mph to 45 mph  
 6727 vehicles in pace  
 Representing 50.7% of the total vehicles

Vehicles > 65 MPH  
 42  
 0.3%

# SPEED

MassDOT Highway Division  
SPEED SUMMARY  
Mon 6/1/2015

Page: 1

STA. 1 SB

Site Reference: 150140000766  
Site ID: 110000000102  
Location: RTE. 1A/LYNWAY, SOUTH OF HANSON ST.  
Direction: ROAD TOTAL

File: SPDC-102.prn  
City: LYNN  
County: SPEED LN-1&2 SB

TIME	10	15	20	25	30	35	40	45	50	55	60	65	70	71+	Total
01:00	1	3	17	25	25	13	28	26	7	7	0	0	0	0	152
02:00	3	5	6	17	11	22	24	19	9	5	1	0	0	0	122
03:00	0	1	11	12	19	10	12	15	5	3	1	0	0	0	89
04:00	1	1	12	20	20	20	19	26	8	5	0	0	0	0	132
05:00	4	7	11	48	45	44	43	49	32	8	0	1	0	0	292
06:00	16	3	47	109	186	111	167	144	75	36	8	5	0	0	907
07:00	53	47	181	363	236	265	394	188	73	24	5	1	0	0	1830
08:00	101	116	302	351	190	261	417	162	26	5	1	0	0	0	1932
09:00	57	52	260	357	229	246	338	158	52	7	1	1	0	0	1758
10:00	21	6	83	227	182	124	274	195	53	20	6	0	0	0	1191
11:00	16	12	71	148	151	144	264	166	50	17	7	1	0	1	1048
12:00	3	10	98	189	138	137	261	172	34	10	1	0	0	0	1053
13:00	8	5	100	172	135	132	292	153	49	12	0	1	0	0	1059
14:00	23	4	75	173	146	127	250	179	62	11	3	1	0	0	1054
15:00	14	7	68	170	183	132	244	191	63	11	2	0	0	0	1085
16:00	12	10	94	169	117	135	267	186	65	16	4	0	0	0	1075
17:00	6	5	58	162	173	122	258	173	67	24	4	2	0	0	1054
18:00	3	11	84	163	171	142	239	166	74	25	1	1	0	0	1080
19:00	11	8	44	115	126	93	198	125	53	19	1	2	0	0	795
20:00	4	6	52	96	99	107	178	127	48	9	0	1	0	0	727
21:00	9	17	76	93	82	104	177	70	23	6	1	0	0	2	660
22:00	5	20	62	71	60	101	124	66	25	6	3	0	0	0	543
23:00	5	14	45	61	43	51	82	58	23	8	3	0	0	0	393
24:00	3	5	22	32	31	16	48	51	15	6	0	0	0	0	229

DAY TOTAL	379	375	1879	3343	2798	2659	4598	2865	991	300	53	17	0	3	20260
PERCENTS	1.9%	1.9%	9.3%	16.6%	13.9%	13.2%	22.7%	14.1%	4.8%	1.4%	0.2%	0.0%	0.0%	0.0%	100%

#### Statistical Information...

15th Percentile Speed  
20.6 mph

85th Percentile Speed  
42.1 mph

Median Speed  
32.6 mph

Average Speed  
31.6 mph

10 MPH Pace Speed  
35 mph to 45 mph  
7463 vehicles in pace  
Representing 36.8% of the total vehicles

Vehicles > 65 MPH  
3  
0.0%

MassDOT Highway Division  
 SPEED SUMMARY  
 Tue 6/2/2015

Page: 2

Site Reference: 150140000766  
 Site ID: 110000000102  
 Location: RTE. 1A/LYNWAY, SOUTH OF HANSON ST.  
 Direction: ROAD TOTAL

File: SPDC-102.prn  
 City: LYNN  
 County: SPEED LN-1&2 SB

TIME	10	15	20	25	30	35	40	45	50	55	60	65	70	71+	Total
01:00	0	3	8	21	16	14	24	22	9	1	1	0	0	0	119
02:00	2	7	18	9	7	14	21	10	2	0	0	0	0	0	90
03:00	2	5	9	12	9	10	17	12	3	1	0	0	0	0	80
04:00	3	3	10	28	18	7	30	22	15	3	2	0	0	2	143
05:00	7	5	22	39	56	30	50	38	39	17	0	0	0	0	303
06:00	9	4	30	151	193	76	124	172	125	33	8	1	0	2	928
07:00	32	30	204	383	253	210	380	271	108	36	8	0	1	2	1918
08:00	91	72	361	325	185	234	398	206	61	16	5	0	0	1	1955
09:00	68	43	264	303	250	278	390	204	75	15	1	0	0	1	1892
10:00	16	2	87	224	240	171	314	208	56	14	4	0	0	1	1337
11:00	12	5	33	169	180	118	218	191	65	20	5	1	0	0	1017
12:00	15	8	63	154	180	151	272	152	63	13	3	0	0	0	1074
13:00	20	15	67	160	169	146	276	160	50	14	2	1	0	0	1080
14:00	14	9	54	148	185	179	243	162	42	18	5	1	0	0	1060
15:00	9	3	31	112	186	170	228	195	74	25	4	0	0	2	1039
16:00	17	5	44	141	170	134	246	170	69	31	5	0	1	2	1035
17:00	11	5	59	134	185	144	245	173	86	15	2	1	0	0	1060
18:00	10	3	35	157	196	120	225	233	93	27	10	2	0	2	1113
19:00	10	3	27	109	156	119	203	191	63	13	8	0	1	0	903
20:00	5	6	22	99	149	89	151	164	57	14	5	1	2	1	765
21:00	3	9	30	75	113	81	149	125	43	11	6	2	0	2	649
22:00	0	9	33	85	103	64	152	84	31	6	4	0	0	1	572
23:00	0	2	23	84	47	52	95	67	32	14	3	2	0	0	421
24:00	0	1	10	31	32	30	53	45	17	1	2	0	0	0	222

DAY TOTAL	356	257	1544	3153	3278	2641	4504	3277	1278	358	93	12	5	19	20775
PERCENTS	1.8%	1.3%	7.5%	15.2%	15.8%	12.8%	21.7%	15.7%	6.1%	1.7%	0.4%	0.0%	0.0%	0.0%	100%

Statistical Information...

15th Percentile Speed  
 21.5 mph

85th Percentile Speed  
 42.9 mph

Median Speed  
 33.4 mph

Average Speed  
 32.4 mph

10 MPH Pace Speed  
 35 mph to 45 mph  
 7781 vehicles in pace  
 Representing 37.4% of the total vehicles

Vehicles > 65 MPH  
 24  
 0.1%

MassDOT Highway Division  
 SPEED SUMMARY  
 Wed 6/3/2015

Page: 3

Site Reference: 150140000766

Site ID: 110000000102

Location: RTE. 1A/LYNNWAY, SOUTH OF HANSON ST.

Direction: ROAD TOTAL

File: SPDC-102.prn

City: LYNN

County: SPEED LN-1&2 SB

TIME	10	15	20	25	30	35	40	45	50	55	60	65	70	71+	Total
01:00	0	2	9	18	22	15	29	19	11	3	1	0	0	0	129
02:00	1	2	7	11	8	13	27	8	11	2	0	0	0	3	93
03:00	0	3	9	13	13	15	20	8	11	5	0	1	0	0	98
04:00	0	5	5	17	19	18	17	17	14	7	2	0	0	0	121
05:00	2	2	18	25	40	51	37	45	36	21	4	1	1	0	283
06:00	21	1	10	65	202	140	139	134	118	49	15	2	0	1	897
07:00	70	24	95	297	306	242	323	212	85	30	6	0	0	2	1692
08:00	90	38	218	332	249	271	358	164	65	19	4	0	0	2	1810
09:00	55	33	148	314	230	187	339	231	86	9	10	2	0	0	1644
10:00	24	6	33	184	221	170	239	243	87	16	3	0	0	2	1228
11:00	16	2	41	132	203	127	273	189	82	11	4	2	0	0	1082
12:00	6	10	44	140	226	160	271	212	59	11	2	1	0	0	1142
13:00	7	6	70	136	181	141	285	174	61	15	0	1	0	2	1079
14:00	10	1	37	130	201	145	236	224	73	9	1	3	0	1	1071
15:00	18	2	42	146	179	156	266	156	85	17	5	1	0	1	1074
16:00	18	5	47	137	168	148	243	232	80	17	3	0	1	2	1101
17:00	14	6	58	185	168	150	267	205	84	21	3	0	1	9	1171
18:00	26	5	49	158	196	168	265	192	84	14	11	1	0	9	1178
19:00	19	4	30	112	159	153	189	178	75	26	4	1	0	4	954
20:00	5	5	29	125	114	132	202	148	54	18	4	3	0	1	840
21:00	4	9	33	119	104	123	202	120	33	9	2	1	0	0	759
22:00	6	11	59	118	87	112	150	97	40	12	0	0	0	0	692
23:00	1	6	27	72	83	75	95	78	33	5	1	0	0	1	477
24:00	3	1	15	38	48	33	42	44	21	5	2	0	0	1	253

DAY TOTAL	416	189	1133	3024	3427	2945	4514	3330	1388	351	87	20	3	41	20868
PERCENTS	2.0%	1.0%	5.5%	14.5%	16.5%	14.2%	21.7%	15.9%	6.6%	1.6%	0.4%	0.0%	0.0%	0.1%	100%

#### Statistical Information...

15th Percentile Speed  
 22.3 mph

Median Speed  
 33.8 mph

10 MPH Pace Speed  
 35 mph to 45 mph  
 7844 vehicles in pace  
 Representing 37.5% of the total vehicles

85th Percentile Speed  
 43.1 mph

Average Speed  
 32.9 mph

Vehicles > 65 MPH  
 44  
 0.2%

MassDOT Highway Division  
 SPEED SUMMARY  
 Thu 6/4/2015

Page: 4

Site Reference: 150140000766

Site ID: 110000000102

Location: RTE. 1A/LYNWAY, SOUTH OF HANSON ST.

Direction: ROAD TOTAL

File: SPDC-102.prn

City: LYNN

County: SPEED LN-1&2 SB

TIME	10	15	20	25	30	35	40	45	50	55	60	65	70	71+	Total
01:00	1	1	7	24	27	19	32	25	8	6	0	0	0	2	152
02:00	1	3	11	10	16	12	17	13	6	2	1	0	0	0	92
03:00	1	2	7	13	19	10	27	15	7	1	0	0	0	0	102
04:00	3	2	7	12	17	17	19	18	14	3	1	0	0	0	113
05:00	6	1	13	30	67	42	46	46	39	19	3	1	0	0	313
06:00	33	4	11	79	192	146	126	121	105	42	19	3	0	0	881
07:00	87	25	136	258	294	195	293	202	94	28	5	5	0	4	1626
08:00	88	9	145	373	283	246	433	207	80	25	4	2	0	0	1895
09:00	151	4	73	264	193	158	402	263	86	18	3	0	0	3	1618
10:00	43	8	46	189	285	157	319	192	80	22	5	1	0	1	1348
11:00	30	7	38	129	184	158	212	216	85	17	3	3	0	0	1082
12:00	17	7	45	141	193	160	231	228	70	23	3	2	0	0	1120
13:00	28	13	45	157	195	133	260	194	62	21	4	0	0	1	1113
14:00	13	11	54	159	188	155	248	209	63	16	3	1	0	5	1125
15:00	37	12	39	140	172	172	281	172	82	21	7	0	0	24	1159
16:00	73	6	38	150	168	151	256	225	72	19	4	1	0	26	1189
17:00	74	5	54	122	183	159	291	207	87	17	2	3	0	21	1225
18:00	99	2	73	130	171	153	254	173	78	31	4	2	3	15	1188

DAY TOTAL	785	122	842	2380	2847	2243	3747	2726	1118	331	71	24	3	102	17341
PERCENTS	4.6%	0.8%	4.9%	13.8%	16.4%	12.9%	21.6%	15.7%	6.4%	1.9%	0.4%	0.1%	0.0%	0.5%	100%

Statistical Information...

15th Percentile Speed  
 21.8 mph

85th Percentile Speed  
 43.3 mph

Median Speed  
 33.8 mph

Average Speed  
 32.4 mph

10 MPH Pace Speed  
 35 mph to 45 mph  
 6473 vehicles in pace  
 Representing 37.3% of the total vehicles

Vehicles > 65 MPH  
 105  
 0.6%

# SPEED

MassDOT Highway Division  
SPEED SUMMARY  
Mon 6/1/2015

Page: 1

STA. 2 NB-LN. 1

Site Reference: 150140000640

Site ID: 110000000201

Location: RTE. 1A/LYNNWAY, NORTH OF COMMERCIAL ST.

Direction: ROAD TOTAL

File: SPD-201-L1.prn

City: LYNN

County: SPEED LN-1 NB

TIME	10	15	20	25	30	35	40	45	50	55	60	65	70	71+	Total
01:00	0	0	0	0	7	5	3	2	1	0	1	0	0	0	19
02:00	0	0	0	1	8	5	4	0	0	0	0	0	0	0	18
03:00	0	0	0	0	16	6	11	0	1	0	0	0	0	0	34
04:00	0	0	0	0	11	11	5	1	0	0	0	0	0	0	28
05:00	0	0	1	5	13	24	13	2	2	1	0	0	0	0	61
06:00	0	0	1	5	11	25	12	10	3	0	0	0	0	2	69
07:00	1	0	1	7	24	44	19	7	5	0	0	0	0	2	110
08:00	0	1	1	9	39	52	30	7	3	0	0	0	0	0	142
09:00	1	0	2	4	48	65	47	14	2	0	0	0	0	3	186
10:00	3	2	4	3	29	34	23	5	0	1	0	0	0	2	106
11:00	0	1	4	11	32	58	32	9	2	0	0	0	0	0	149
12:00	1	0	4	10	36	57	32	9	3	0	0	0	0	0	152
13:00	0	1	5	4	44	72	43	13	2	1	0	0	0	0	185
14:00	0	2	3	4	35	66	50	18	5	0	0	0	0	0	183
15:00	0	0	2	16	49	113	64	15	3	0	0	0	0	0	262
16:00	1	1	3	7	83	128	106	32	4	0	0	0	0	0	365
17:00	0	0	8	22	93	217	115	23	5	0	0	0	0	0	483
18:00	0	2	0	31	170	236	99	29	3	0	0	0	0	0	570
19:00	0	1	4	39	109	200	111	23	7	0	0	0	0	0	494
20:00	0	0	0	8	63	111	77	10	1	0	0	0	0	0	270
21:00	0	0	1	6	28	38	28	10	2	0	0	0	0	4	117
22:00	1	0	1	1	19	26	26	10	2	0	1	0	0	1	88
23:00	0	0	0	4	8	37	26	8	1	0	0	0	0	0	84
24:00	0	0	1	6	6	16	12	6	1	0	0	0	0	2	50

DAY TOTAL	8	11	46	203	981	1646	988	263	.58	3	2	0	0	16	4225
PERCENTS	0.2%	0.3%	1.1%	4.9%	23.3%	39.0%	23.4%	6.2%	1.3%	0.0%	0.0%	0.0%	0.0%	0.3%	100%

## Statistical Information...

15th Percentile Speed  
26.9 mph

85th Percentile Speed  
38.5 mph

Median Speed  
32.6 mph

Average Speed  
32.6 mph

10 MPH Pace Speed  
30 mph to 40 mph  
2634 vehicles in pace  
Representing 62.3% of the total vehicles

Vehicles > 65 MPH  
16  
0.4%

MassDOT Highway Division  
 SPEED SUMMARY  
 Tue 6/2/2015

Page: 2

Site Reference: 150140000640  
 Site ID: 110000000201  
 Location: RTE. 1A/LYNNWAY, NORTH OF COMMERCIAL ST.  
 Direction: ROAD TOTAL

File: SPD-201-L1.prn  
 City: LYNN  
 County: SPEED LN-1 NB

TIME	10	15	20	25	30	35	40	45	50	55	60	65	70	71+	Total
01:00	0	0	0	1	7	7	12	2	3	0	0	0	0	0	32
02:00	0	0	0	3	5	4	3	1	0	0	0	0	0	2	18
03:00	0	0	0	1	7	6	2	3	0	0	0	0	0	2	21
04:00	0	0	0	1	6	9	4	0	0	0	0	0	0	0	20
05:00	0	0	1	6	12	9	9	1	1	2	0	0	0	0	41
06:00	2	1	2	4	13	20	13	4	1	0	0	0	0	0	60
07:00	0	1	2	4	24	34	21	6	2	0	0	0	0	0	94
08:00	0	1	3	6	30	50	37	14	2	0	0	0	0	2	145
09:00	0	0	5	12	52	74	33	14	3	0	0	0	0	0	193
10:00	1	0	0	7	30	55	26	13	1	0	0	0	0	2	135
11:00	1	0	4	11	41	57	36	14	2	0	0	0	0	0	166
12:00	0	0	2	13	32	67	39	7	1	0	0	0	0	0	161
13:00	0	0	1	9	45	49	46	14	1	0	0	0	0	0	165
14:00	0	0	3	17	58	88	36	9	2	0	0	0	0	0	213
15:00	0	1	2	9	44	92	57	16	0	0	0	0	0	4	225
16:00	1	0	3	21	90	140	71	14	1	0	0	0	0	0	341
17:00	1	2	7	26	119	162	90	16	5	1	0	0	0	0	429
18:00	0	3	6	19	99	212	129	47	7	1	0	0	0	0	523
19:00	3	0	2	16	74	205	153	44	6	0	0	0	0	0	503
20:00	0	0	0	2	31	98	73	26	7	1	0	0	0	0	238
21:00	3	0	1	2	10	41	46	30	9	0	0	0	0	2	144
22:00	0	0	1	1	12	30	38	18	4	0	0	0	0	0	104
23:00	0	0	2	0	11	18	33	12	6	0	0	0	0	0	82
24:00	0	0	0	4	6	10	17	4	4	0	0	0	0	0	45

DAY TOTAL	12	9	47	195	858	1537	1024	329	68	5	0	0	0	14	4098
PERCENTS	0.3%	0.3%	1.2%	4.8%	21.0%	37.5%	24.9%	8.0%	1.6%	0.1%	0.0%	0.0%	0.0%	0.3%	100%

Statistical Information...

15th Percentile Speed  
 27.1 mph

85th Percentile Speed  
 39.0 mph

Median Speed  
 33.0 mph

Average Speed  
 33.0 mph

10 MPH Pace Speed  
 30 mph to 40 mph  
 2561 vehicles in pace  
 Representing 62.4% of the total vehicles

Vehicles > 65 MPH  
 14  
 0.3%

MassDOT Highway Division  
 SPEED SUMMARY  
 Wed 6/3/2015

Page: 3

Site Reference: 150140000640  
 Site ID: 110000000201  
 Location: RTE. 1A/LYNWAY, NORTH OF COMMERCIAL ST.  
 Direction: ROAD TOTAL

File: SPD-201-L1.prn  
 City: LYNN  
 County: SPEED LN-1 NB

TIME	10	15	20	25	30	35	40	45	50	55	60	65	70	71+	Total
01:00	0	0	0	3	6	2	6	4	6	0	0	0	0	0	27
02:00	0	0	0	0	2	6	7	1	1	0	0	0	0	0	17
03:00	0	0	0	1	9	2	2	1	0	0	0	0	0	0	15
04:00	0	0	1	3	7	9	3	3	0	0	0	0	0	0	26
05:00	0	0	3	1	14	15	5	4	1	0	0	0	0	0	43
06:00	0	0	0	2	9	25	13	13	7	2	0	0	0	0	71
07:00	0	0	1	2	15	37	41	18	7	0	0	0	0	0	121
08:00	0	2	0	3	30	62	58	18	5	3	1	0	0	0	182
09:00	0	0	4	9	34	67	67	21	4	1	0	0	0	0	207
10:00	2	1	0	15	35	63	38	7	0	0	0	0	0	4	165
11:00	0	0	2	13	46	82	40	19	0	0	0	0	0	0	202
12:00	1	0	3	5	39	61	22	8	1	0	0	0	0	0	140
13:00	0	0	2	19	53	95	48	14	3	0	0	0	0	0	234
14:00	3	1	2	12	47	94	57	12	5	0	0	0	0	0	233
15:00	0	0	1	12	47	96	75	29	6	2	0	0	0	0	268
16:00	1	0	2	9	79	178	108	40	4	0	0	0	0	0	421
17:00	0	1	5	25	82	225	159	41	7	0	0	0	0	0	545
18:00	5	3	1	13	114	255	181	39	7	1	0	0	0	0	619
19:00	0	1	4	12	105	171	147	40	10	1	1	1	0	0	493
20:00	0	0	2	11	36	123	103	33	13	0	0	0	0	0	321
21:00	0	0	1	6	22	61	70	25	8	1	0	0	1	0	195
22:00	2	1	3	6	22	49	43	19	0	0	0	0	0	0	145
23:00	1	0	1	1	8	31	38	14	5	0	0	0	0	1	100
24:00	0	0	1	4	7	11	19	20	5	0	0	0	0	0	67

DAY TOTAL	15	10	39	187	868	1820	1350	443	105	11	2	1	1	5	4857
PERCENTS	0.4%	0.3%	0.9%	3.9%	17.9%	37.4%	27.7%	9.1%	2.1%	0.2%	0.0%	0.0%	0.0%	0.1%	100%

Statistical Information...

15th Percentile Speed  
 27.8 mph

85th Percentile Speed  
 39.4 mph

Median Speed  
 33.6 mph

Average Speed  
 33.7 mph

10 MPH Pace Speed  
 30 mph to 40 mph  
 3170 vehicles in pace  
 Representing 65.2% of the total vehicles

Vehicles > 65 MPH  
 6  
 0.1%

MassDOT Highway Division  
 SPEED SUMMARY  
 Thu 6/4/2015

Page: 4

Site Reference: 150140000640  
 Site ID: 110000000201  
 Location: RTE. 1A/LYNNWAY, NORTH OF COMMERCIAL ST.  
 Direction: ROAD TOTAL

File: SPD-201-L1.prn  
 City: LYNN  
 County: SPEED LN-1 NB

TIME	10	15	20	25	30	35	40	45	50	55	60	65	70	71+	Total
01:00	0	0	0	3	7	12	8	3	2	0	0	0	0	0	35
02:00	0	0	0	0	2	6	3	3	1	0	0	0	0	0	15
03:00	0	0	1	2	4	8	2	1	2	0	0	0	0	0	20
04:00	0	0	1	2	7	7	6	4	1	0	0	0	0	0	28
05:00	0	0	1	4	18	23	5	3	0	0	0	0	0	0	54
06:00	0	0	0	7	11	30	17	3	3	0	0	0	0	0	71
07:00	0	0	2	4	18	48	41	14	8	2	0	0	0	0	137
08:00	0	1	2	9	28	72	57	34	5	0	0	0	0	0	208
09:00	0	0	2	12	42	87	39	15	8	0	0	0	0	0	205
10:00	0	0	3	13	43	58	50	14	1	0	0	0	0	0	182
11:00	0	0	1	14	46	74	42	16	0	0	0	0	0	0	193
12:00	0	0	7	8	44	86	38	15	2	0	0	0	0	0	200
13:00	1	0	1	14	60	87	70	12	4	1	0	0	0	0	250
14:00	0	0	2	12	52	114	65	32	4	1	0	0	0	0	282
15:00	1	0	3	4	49	120	86	26	8	1	1	0	0	1	300
16:00	2	1	4	10	87	185	126	21	2	1	0	0	0	0	439
17:00	0	0	4	17	92	186	135	49	8	2	0	0	0	0	493
18:00	3	4	5	20	125	248	171	37	2	1	0	0	0	0	616

DAY TOTAL	7	6	39	.155	735	1451	961	302	61	9	1	0	0	1	3728
PERCENTS	0.2%	0.2%	1.1%	4.2%	19.8%	38.9%	25.7%	8.1%	1.6%	0.2%	0.0%	0.0%	0.0%	0.0%	100%

Statistical Information...

15th Percentile Speed  
 27.4 mph

85th Percentile Speed  
 39.0 mph

Median Speed  
 33.2 mph

Average Speed  
 33.3 mph

10 MPH Pace Speed  
 30 mph to 40 mph  
 2412 vehicles in pace  
 Representing 64.6% of the total vehicles

Vehicles > 65 MPH  
 1  
 0.0%

# SPEED

MassDOT Highway Division  
SPEED SUMMARY  
Wed 6/3/2015

Page: 1

STA. 2NB - LN.3

Site Reference: 150140000603

Site ID: 330000000201

Location: RTE. 1A/LYNNWAY, NORTH OF COMMERCIAL ST.

Direction: ROAD TOTAL

File: SPD-201-L3.prn

City: LYNN

County: SPEED LN-3 NB

TIME	10	15	20	25	30	35	40	45	50	55	60	65	70	71+	Total
11:00	0	0	0	1	26	138	124	41	17	0	0	0	0	0	347
12:00	0	1	0	7	38	163	158	43	12	2	0	0	0	0	424
13:00	0	1	5	21	47	165	160	56	13	3	0	0	0	0	471
14:00	3	0	1	5	42	176	169	49	15	4	0	1	0	0	465
15:00	0	0	1	6	27	151	224	75	21	3	0	0	0	0	508
16:00	4	3	2	15	78	199	218	92	16	1	0	1	0	0	629
17:00	4	3	4	15	89	249	245	86	22	0	0	0	0	0	717
18:00	7	1	6	25	98	294	268	101	27	2	0	0	0	0	829
19:00	1	7	4	16	84	219	252	97	17	1	2	0	0	0	700
20:00	1	0	3	5	32	131	214	96	19	3	2	0	0	0	506
21:00	1	0	1	0	15	101	162	78	22	6	0	0	0	3	389
22:00	0	1	0	0	15	95	168	55	8	2	0	0	0	0	344
23:00	0	0	0	2	17	63	93	67	15	3	0	0	0	0	260
24:00	0	0	0	0	0	30	90	45	12	1	0	0	0	0	178

DAY TOTAL	21	17	27	118	608	2174	2545	981	236	31	4	2	0	3	6767
PERCENTS	0.4%	0.3%	0.4%	1.8%	9.0%	32.2%	37.7%	14.4%	3.4%	0.4%	0.0%	0.0%	0.0%	100%	

## Statistical Information...

15th Percentile Speed  
30.5 mph

85th Percentile Speed  
41.2 mph

Median Speed  
35.8 mph

Average Speed  
35.7 mph

10 MPH Pace Speed  
30 mph to 40 mph  
4719 vehicles in pace  
Representing 69.7% of the total vehicles

Vehicles > 65 MPH  
3  
0.0%

MassDOT Highway Division  
 SPEED SUMMARY  
 Thu 6/4/2015

Page: 2

Site Reference: 150140000603  
 Site ID: 330000000201  
 Location: RTE. 1A/LYNNWAY, NORTH OF COMMERCIAL ST.  
 Direction: ROAD TOTAL

File: SPD-201-L3.prn  
 City: LYNN  
 County: SPEED LN-3 NB

TIME	10	15	20	25	30	35	40	45	50	55	60	65	70	71+	Total
01:00	0	0	0	0	3	12	45	29	7	2	0	0	0	0	98
02:00	0	0	0	0	4	9	26	15	5	0	1	0	0	0	60
03:00	0	0	0	0	0	10	15	8	3	0	2	0	0	0	38
04:00	0	0	0	1	1	3	11	4	4	1	1	0	0	0	26
05:00	0	0	0	1	0	7	12	9	6	3	0	0	0	0	38
06:00	0	0	0	0	2	10	38	29	11	6	0	0	0	0	96
07:00	0	0	0	0	4	21	78	64	23	4	1	0	0	0	195
08:00	0	0	0	5	17	91	140	93	29	8	0	0	0	0	383
09:00	0	0	0	3	25	104	164	93	17	6	2	0	0	0	414
10:00	0	0	1	2	17	108	147	67	17	1	1	0	0	0	361
11:00	0	0	0	2	28	132	139	46	12	1	0	0	0	0	360
12:00	2	0	0	1	27	116	149	53	7	2	1	1	0	0	359
13:00	0	1	2	5	32	159	186	52	16	1	0	0	0	0	454
14:00	0	0	0	10	41	162	180	70	17	3	1	0	0	0	484
15:00	1	0	0	1	38	149	198	79	17	5	0	0	0	0	488
16:00	1	1	8	19	68	221	262	79	15	4	0	0	0	0	678
17:00	3	2	7	9	56	204	264	113	23	1	0	1	0	0	683
18:00	7	5	13	32	87	301	270	88	18	4	0	0	0	0	825

DAY TOTAL	14	9	31	91	450	1819	2324	991	247	52	10	2	0	0	6040
PERCENTS	0.3%	0.2%	0.6%	1.6%	7.5%	30.1%	38.4%	16.4%	4.0%	0.8%	0.1%	0.0%	0.0%	0.0%	100%

Statistical Information...

15th Percentile Speed  
 30.9 mph

85th Percentile Speed  
 42.0 mph

Median Speed  
 36.3 mph

Average Speed  
 36.2 mph

10 MPH Pace Speed  
 30 mph to 40 mph  
 4143 vehicles in pace  
 Representing 68.5% of the total vehicles

Vehicles > 65 MPH  
 0  
 0.0%

# SPEED

MassDOT Highway Division  
SPEED SUMMARY  
Mon 6/1/2015

Page: 1

*STA.3 NB - LN.1*

Site Reference: 150140000485

Site ID: 110000000301

Location: RTE. 1A/LYNWAY, BTWN NEWELL&WASHINGTON

Direction: ROAD TOTAL

File: SPD-301-L1.prn

City: LYNN

County: SPEED LN-1 NB

TIME	10	15	20	25	30	35	40	45	50	55	60	65	70	71+	Total
01:00	0	0	0	0	0	6	6	2	0	0	0	0	0	0	14
02:00	0	0	0	0	1	2	1	0	0	0	0	0	0	0	4
03:00	0	0	1	0	0	0	1	1	0	0	0	0	0	0	3
04:00	0	0	0	0	1	1	0	0	0	0	0	0	0	0	2
05:00	0	0	0	1	1	2	0	0	0	0	0	0	0	0	4
06:00	0	0	0	0	4	3	3	0	0	0	0	0	0	0	10
07:00	0	0	0	2	6	12	5	5	1	0	0	0	0	0	31
08:00	1	0	2	4	9	30	12	5	0	1	0	0	0	0	64
09:00	0	0	1	1	25	48	26	2	0	1	0	0	0	0	104
10:00	0	0	2	10	32	49	16	8	1	1	0	0	0	0	119
11:00	0	1	5	11	22	34	24	4	1	0	0	0	0	0	102
12:00	0	2	7	9	17	44	42	5	2	0	0	0	0	0	128
13:00	0	1	3	11	27	51	43	12	2	0	0	0	0	0	150
14:00	1	2	4	14	39	57	38	4	2	0	0	0	0	0	161
15:00	0	1	13	10	42	49	49	9	5	0	0	0	0	0	178
16:00	0	1	9	10	29	76	57	11	0	0	0	0	0	0	193
17:00	0	0	6	11	67	119	60	20	4	1	0	0	0	0	288
18:00	0	0	8	31	76	123	62	13	1	0	0	0	0	0	314
19:00	0	11	18	14	65	115	59	20	1	1	0	0	0	0	304
20:00	0	1	8	14	43	79	43	10	4	0	0	0	0	0	202
21:00	0	0	2	10	22	52	23	6	0	0	0	0	0	0	115
22:00	0	0	3	3	21	32	17	4	1	0	0	0	0	0	81
23:00	0	0	0	3	6	21	10	2	0	0	0	0	0	0	42
24:00	0	0	0	2	3	9	9	2	0	0	0	0	0	0	25

DAY TOTAL	2	20	92	171	558	1014	606	145	25	5	0	0	0	0	2638
PERCENTS	0.1%	0.8%	3.5%	6.5%	21.2%	38.5%	23.0%	5.4%	0.9%	0.1%	0.0%	0.0%	0.0%	0.0%	100%

Statistical Information...

15th Percentile Speed  
26.0 mph

85th Percentile Speed  
38.2 mph

Median Speed  
32.4 mph

Average Speed  
32.0 mph

10 MPH Pace Speed  
30 mph to 40 mph  
1620 vehicles in pace  
Representing 61.4% of the total vehicles

Vehicles > 65 MPH  
0  
0.0%

MassDOT Highway Division  
 SPEED SUMMARY  
 Tue 6/2/2015

Page: 2

Site Reference: 150140000485  
 Site ID: 110000000301  
 Location: RTE. 1A/LYNNWAY, BTWN NEWELL&WASHINGTON  
 Direction: ROAD TOTAL

File: SPD-301-L1.prn  
 City: LYNN  
 County: SPEED LN-1 NB

TIME	10	15	20	25	30	35	40	45	50	55	60	65	70	71+	Total
01:00	0	0	0	0	0	6	5	3	0	0	0	0	0	0	14
02:00	0	0	0	0	0	7	4	0	0	0	0	0	0	0	11
03:00	0	0	0	1	0	1	0	0	0	0	0	0	0	0	2
04:00	0	0	0	0	3	0	0	0	0	0	0	0	0	0	3
05:00	0	0	0	1	3	2	2	0	0	0	0	0	0	0	8
06:00	0	0	1	0	1	5	1	0	0	0	0	0	0	0	8
07:00	2	1	0	2	10	9	6	3	0	0	0	0	0	0	33
08:00	1	0	0	4	15	29	14	4	0	0	0	0	0	0	67
09:00	0	1	1	3	25	35	21	4	1	1	0	0	0	0	92
10:00	0	1	2	14	22	44	16	4	4	0	0	0	0	0	107
11:00	0	3	5	12	24	31	19	6	2	0	0	0	0	0	102
12:00	0	5	5	13	26	56	29	5	2	0	0	0	0	0	141
13:00	0	1	7	13	31	47	40	5	1	0	0	0	0	0	145
14:00	0	0	7	19	29	61	36	7	0	0	0	0	0	0	159
15:00	0	5	7	10	44	51	40	10	0	0	0	0	0	0	167
16:00	0	1	4	11	49	90	59	22	1	1	0	0	0	0	238
17:00	0	0	6	20	68	90	54	15	4	0	0	0	0	0	257
18:00	0	1	2	12	54	133	72	20	1	0	0	0	0	0	295
19:00	0	0	3	9	53	111	62	15	3	1	0	0	0	0	257
20:00	0	0	4	6	27	74	56	20	3	1	0	0	0	0	191
21:00	0	0	2	9	22	49	35	12	0	1	0	0	0	0	130
22:00	0	0	0	3	9	29	25	6	1	0	0	0	0	0	73
23:00	0	0	1	1	8	27	23	9	5	0	0	0	0	0	74
24:00	0	0	0	2	1	10	13	4	1	0	0	0	0	0	31

DAY TOTAL	3	19	57	165	524	997	632	174	29	5	0	0	0	0	2605
PERCENTS	0.2%	0.8%	2.2%	6.4%	20.2%	38.2%	24.2%	6.6%	1.1%	0.1%	0.0%	0.0%	0.0%	0.0%	100%

Statistical Information...

15th Percentile Speed  
 26.4 mph

85th Percentile Speed  
 38.6 mph

Median Speed  
 32.7 mph

Average Speed  
 32.5 mph

10 MPH Pace Speed  
 30 mph to 40 mph  
 1629 vehicles in pace  
 Representing 62.5% of the total vehicles

Vehicles > 65 MPH  
 0  
 0.0%

MassDOT Highway Division  
 SPEED SUMMARY  
 Wed 6/3/2015

Page: 3

Site Reference: 150140000485

Site ID: 110000000301

Location: RTE. 1A/LYNNWAY, BTWN NEWELL&WASHINGTON

Direction: ROAD TOTAL

File: SPD-301-L1.prn

City: LYNN

County: SPEED LN-1 NB

TIME	10	15	20	25	30	35	40	45	50	55	60	65	70	71+	Total
01:00	0	0	0	1	2	4	9	2	1	0	0	0	0	0	19
02:00	0	0	0	1	1	3	0	4	0	0	0	0	0	0	9
03:00	0	0	0	1	0	1	0	0	0	0	0	0	0	0	2
04:00	0	0	1	1	1	4	3	1	0	0	0	0	0	0	11
05:00	0	0	0	1	3	2	1	0	0	0	0	0	0	0	7
06:00	0	0	0	0	0	3	7	3	4	1	0	0	0	0	18
07:00	0	0	4	13	2	7	8	3	1	3	0	0	0	0	41
08:00	0	0	5	8	18	35	23	9	1	0	0	0	0	0	99
09:00	1	0	1	5	22	47	30	9	1	0	0	0	0	0	116
10:00	0	1	4	13	31	55	23	15	1	0	0	0	0	0	143
11:00	2	2	4	14	30	46	21	11	5	0	0	0	0	0	135
12:00	0	0	7	9	30	65	40	7	0	0	0	0	0	0	158
13:00	1	0	6	18	34	66	42	4	1	0	0	0	0	0	172
14:00	0	2	7	16	27	53	27	7	2	0	0	0	0	0	141
15:00	3	1	8	17	44	46	21	9	1	2	0	0	0	0	152
16:00	0	0	5	21	54	92	64	23	2	1	0	0	0	0	262
17:00	0	0	10	34	58	112	81	13	3	0	1	0	0	0	312
18:00	8	9	31	56	118	115	27	8	1	0	0	0	0	0	373
19:00	3	2	24	88	85	78	25	4	0	1	0	0	0	0	310
20:00	1	0	5	16	28	68	64	15	1	1	0	0	0	0	199
21:00	0	0	1	9	31	55	35	7	2	1	0	0	0	0	141
22:00	0	0	1	5	20	52	25	5	0	0	0	0	0	0	108
23:00	0	0	3	3	11	26	24	4	2	0	0	0	0	0	73
24:00	0	0	0	2	2	25	17	4	0	0	0	0	0	0	50

DAY TOTAL	19	17	127	352	655	1064	613	168	26	9	1	0	0	0	3051
PERCENTS	0.7%	0.6%	4.2%	11.6%	21.5%	34.9%	20.0%	5.5%	0.8%	0.2%	0.0%	0.0%	0.0%	0.0%	100%

Statistical Information...

15th Percentile Speed  
 24.2 mph

85th Percentile Speed  
 37.9 mph

Median Speed  
 31.7 mph

Average Speed  
 31.1 mph

10 MPH Pace Speed  
 25 mph to 35 mph  
 1719 vehicles in pace  
 Representing 56.3% of the total vehicles

Vehicles > 65 MPH  
 0  
 0.0%

MassDOT Highway Division  
 SPEED SUMMARY  
 Thu 6/4/2015

Page: 4

Site Reference: 150140000485  
 Site ID: 110000000301  
 Location: RTE. 1A/LYNWAY, BTWN NEWELL&WASHINGTON  
 Direction: ROAD TOTAL

File: SPD-301-L1.prn  
 City: LYNN  
 County: SPEED LN-1 NB

TIME	10	15	20	25	30	35	40	45	50	55	60	65	70	71+	Total
01:00	0	0	0	1	3	8	4	2	1	0	0	0	0	0	19
02:00	0	0	0	0	0	4	2	2	0	0	0	0	0	0	8
03:00	0	0	0	2	0	1	2	0	0	0	0	0	0	0	5
04:00	0	0	0	0	0	0	3	0	0	0	0	0	0	0	3
05:00	0	0	1	1	2	2	2	0	1	0	0	0	0	0	9
06:00	0	0	1	1	2	8	10	5	1	1	0	0	0	0	29
07:00	0	0	1	3	7	20	11	5	0	2	0	0	0	0	49
08:00	0	0	1	9	13	44	23	5	3	1	0	0	0	0	99
09:00	0	0	5	7	24	44	47	13	6	0	0	0	0	0	146
10:00	0	0	4	13	24	53	40	8	2	0	0	0	0	0	144
11:00	0	1	6	14	31	51	32	8	3	0	0	0	0	0	146
12:00	0	1	7	15	39	48	46	8	0	0	0	0	0	0	164
13:00	0	0	5	21	38	75	48	9	2	0	0	0	0	0	198
14:00	4	0	5	21	48	67	52	12	2	2	0	0	0	0	213
15:00	0	1	10	16	38	75	49	10	1	2	0	0	1	0	203
16:00	1	0	6	30	66	76	61	20	4	0	0	0	0	0	264
17:00	0	1	10	29	65	100	61	16	1	0	0	0	0	0	283
18:00	0	0	9	35	88	150	67	8	1	0	0	0	0	0	358

DAY TOTAL	5	4	71	218	488	826	560	131	28	8	0	0	1	0	2340
PERCENTS	0.3%	0.2%	3.1%	9.4%	20.9%	35.3%	23.9%	5.5%	1.1%	0.3%	0.0%	0.0%	0.0%	0.0%	100%

Statistical Information...

15th Percentile Speed  
 25.6 mph

85th Percentile Speed  
 38.4 mph

Median Speed  
 32.3 mph

Average Speed  
 32.0 mph

10 MPH Pace Speed  
 30 mph to 40 mph  
 1386 vehicles in pace  
 Representing 59.2% of the total vehicles

Vehicles > 65 MPH  
 1  
 0.0%

# SPEED

MassDOT Highway Division  
SPEED SUMMARY  
Mon 6/1/2015

Page: 1

STA. 3 NB - LN. 3

Site Reference: 150140000183

Site ID: 330000000301

Location: RTE. 1A/LYNNWAY, BTWN NEWELL&WASHINGTON

Direction: ROAD TOTAL

File: SPD-301-L3.prn

City: LYNN

County: SPEED LN-3 NB

TIME	10	15	20	25	30	35	40	45	50	55	60	65	70	71+	Total
01:00	0	0	0	0	1	4	11	6	5	0	0	0	0	0	27
02:00	0	0	0	0	3	0	6	1	0	3	0	0	0	0	13
03:00	0	0	0	1	0	0	0	3	1	0	0	0	0	0	5
04:00	0	0	0	0	1	0	0	2	0	0	0	0	0	0	3
05:00	0	0	0	0	0	2	4	0	1	0	0	0	0	0	7
06:00	0	0	0	0	0	2	2	6	9	3	1	0	0	0	23
07:00	0	0	0	0	1	8	13	16	8	3	0	0	0	0	49
08:00	0	0	0	3	5	17	66	29	14	1	1	0	0	0	136
09:00	0	0	0	0	3	28	52	39	19	1	1	0	0	0	143
10:00	0	0	0	2	4	29	37	37	10	3	1	0	0	0	123
11:00	0	0	0	1	8	11	50	39	14	4	0	0	0	0	127
12:00	0	0	0	3	3	18	39	39	16	2	0	0	0	0	120
13:00	0	0	0	0	3	23	49	42	15	9	1	0	0	0	142
14:00	0	0	2	6	8	24	70	46	12	5	1	0	0	0	174
15:00	0	0	0	2	9	43	75	48	20	3	2	0	0	0	202
16:00	0	0	0	2	8	43	94	99	34	7	0	1	0	0	288
17:00	0	0	0	0	5	54	145	93	49	8	1	0	0	0	355
18:00	1	0	0	6	36	115	198	95	34	9	2	0	0	0	496
19:00	0	2	2	5	18	90	189	126	41	0	0	0	0	0	473
20:00	0	0	0	0	10	41	106	73	28	7	0	0	0	0	265
21:00	0	0	0	2	9	36	42	28	9	2	1	0	0	0	129
22:00	0	0	0	1	7	19	38	24	5	1	0	0	0	0	95
23:00	0	0	0	0	2	10	32	18	4	2	0	0	0	0	68
24:00	0	0	0	0	1	5	15	11	5	1	0	0	0	0	38

DAY TOTAL	1	2	4	34	147	622	1337	923	347	72	11	1	0	0	3501
PERCENTS	0.1%	0.1%	0.2%	1.0%	4.2%	17.8%	38.1%	26.3%	9.9%	2.0%	0.3%	0.0%	0.0%	0.0%	100%

## Statistical Information...

15th Percentile Speed  
32.7 mph

85th Percentile Speed  
44.5 mph

Median Speed  
38.5 mph

Average Speed  
38.7 mph

10 MPH Pace Speed  
35 mph to 45 mph  
2260 vehicles in pace  
Representing 64.5% of the total vehicles

Vehicles > 65 MPH  
0  
0.0%

MassDOT Highway Division  
 SPEED SUMMARY  
 Tue 6/2/2015

Page: 2

Site Reference: 150140000183

Site ID: 330000000301

Location: RTE. 1A/LYNNWAY, BTWN NEWELL&WASHINGTON

Direction: ROAD TOTAL

File: SPD-301-L3.prn

City: LYNN

County: SPEED LN-3 NB

TIME	10	15	20	25	30	35	40	45	50	55	60	65	70	71+	Total
01:00	0	0	0	0	0	3	4	7	1	1	0	0	0	0	16
02:00	0	0	0	0	0	2	4	0	3	0	0	0	0	0	9
03:00	0	0	0	1	0	3	4	0	0	0	0	0	0	0	8
04:00	0	0	0	0	0	2	2	0	0	0	0	0	0	0	4
05:00	0	0	0	1	0	2	0	1	0	0	0	0	0	0	4
06:00	0	0	0	0	1	2	5	11	6	0	0	0	0	0	25
07:00	0	0	0	1	1	14	17	11	16	4	0	0	0	0	64
08:00	0	0	0	3	2	18	65	35	9	3	1	1	0	0	137
09:00	0	0	0	0	2	26	40	36	17	3	1	0	1	0	126
10:00	0	0	3	2	7	13	30	27	16	5	0	0	0	0	103
11:00	0	0	0	0	1	28	54	42	14	1	0	0	0	0	140
12:00	0	0	0	3	2	25	67	35	13	1	1	1	0	0	148
13:00	0	0	4	2	6	31	56	48	27	4	0	0	0	0	178
14:00	0	0	0	3	6	21	65	51	24	3	0	0	0	0	173
15:00	0	0	1	1	17	40	91	77	29	3	0	0	0	0	259
16:00	0	0	2	5	9	39	102	96	42	6	0	0	0	0	301
17:00	0	0	0	10	23	68	134	97	37	2	1	0	0	0	372
18:00	1	0	0	5	15	77	195	158	54	15	0	0	0	0	520
19:00	1	0	0	8	9	65	173	125	49	10	0	1	0	0	441
20:00	0	0	0	2	8	36	96	68	34	10	2	0	0	0	256
21:00	0	0	0	1	4	26	39	55	26	7	0	0	0	0	158
22:00	0	0	1	1	3	10	41	45	27	6	1	0	0	0	135
23:00	0	0	0	0	0	13	17	37	14	11	0	0	0	0	92
24:00	0	0	0	0	2	2	21	20	10	1	1	0	0	0	57

DAY TOTAL	2	0	11	49	118	566	1322	1082	468	96	8	3	1	0	3726
PERCENTS	0.1%	0.0%	0.3%	1.4%	3.2%	15.2%	35.5%	29.1%	12.5%	2.5%	0.2%	0.0%	0.0%	0.0%	100%

Statistical Information...

15th Percentile Speed  
 33.4 mph

85th Percentile Speed  
 45.2 mph

Median Speed  
 39.2 mph

Average Speed  
 39.3 mph

10 MPH Pace Speed  
 35 mph to 45 mph  
 2404 vehicles in pace  
 Representing 64.5% of the total vehicles

Vehicles > 65 MPH  
 1  
 0.0%

MassDOT Highway Division  
 SPEED SUMMARY  
 Wed 6/3/2015

Page: 3

Site Reference: 150140000183

Site ID: 330000000301

Location: RTE. 1A/LYNNWAY, BTWN NEWELL&WASHINGTON

Direction: ROAD TOTAL

File: SPD-301-L3.prn

City: LYNN

County: SPEED LN-3 NB

TIME	10	15	20	25	30	35	40	45	50	55	60	65	70	71+	Total
01:00	0	0	0	0	2	2	11	5	2	2	0	0	0	0	24
02:00	0	0	0	1	0	0	5	1	2	0	0	0	0	0	9
03:00	0	0	0	0	0	2	0	1	1	0	0	0	0	0	4
04:00	0	0	0	0	0	0	2	1	0	0	0	0	0	0	3
05:00	0	0	0	0	0	1	3	3	3	0	0	0	0	0	10
06:00	0	0	0	0	0	2	4	0	9	8	4	4	0	0	31
07:00	0	0	0	0	9	6	5	9	12	14	2	1	0	0	58
08:00	0	0	0	13	14	11	40	44	25	8	0	0	0	0	155
09:00	0	0	0	3	8	22	40	35	24	7	1	0	0	0	140
10:00	0	0	2	4	4	12	40	30	17	3	1	0	0	0	113
11:00	0	0	0	0	5	10	51	36	20	2	0	0	0	0	124
12:00	0	0	0	0	6	17	46	48	23	3	1	0	0	0	144
13:00	0	0	2	2	8	24	60	57	25	6	0	0	0	0	184
14:00	0	0	0	3	6	25	56	44	27	4	1	0	0	0	166
15:00	0	0	1	9	39	70	84	42	15	8	1	0	0	0	269
16:00	0	0	0	4	10	38	104	88	49	12	2	0	0	0	307
17:00	0	0	2	18	40	63	130	97	60	8	2	0	0	0	420
18:00	50	13	34	63	106	156	104	29	7	3	0	0	0	0	565
19:00	51	29	22	52	121	104	92	31	13	1	1	0	0	0	517
20:00	2	1	0	5	16	28	88	83	41	9	2	0	0	0	275
21:00	0	0	0	3	14	24	77	55	27	8	3	0	0	0	211
22:00	0	0	0	3	4	20	59	29	20	7	2	1	0	0	145
23:00	0	0	0	1	1	20	42	28	13	8	2	0	0	1	116
24:00	0	0	1	1	1	7	22	24	12	4	0	0	0	1	73

DAY TOTAL	103	43	64	194	413	665	1165	832	448	109	24	1	0	2	4063
PERCENTS	2.6%	1.1%	1.6%	4.8%	10.2%	16.4%	28.7%	20.5%	11.0%	2.6%	0.5%	0.0%	0.0%	0.0%	100%

Statistical Information...

15th Percentile Speed  
 27.5 mph

85th Percentile Speed  
 44.9 mph

Median Speed  
 37.4 mph

Average Speed  
 36.2 mph

10 MPH Pace Speed  
 35 mph to 45 mph  
 1997 vehicles in pace  
 Representing 49.1% of the total vehicles

Vehicles > 65 MPH  
 2  
 0.0%

MassDOT Highway Division  
 SPEED SUMMARY  
 Thu 6/4/2015

Page: 4

Site Reference: 150140000183

Site ID: 330000000301

Location: RTE. 1A/LYNWAY, BTWN NEWELL&WASHINGTON

Direction: ROAD TOTAL

File: SPD-301-L3.prn

City: LYNN

County: SPEED LN-3 NB

TIME	10	15	20	25	30	35	40	45	50	55	60	65	70	71+	Total
01:00	0	0	0	0	0	4	6	9	4	1	4	1	0	0	29
02:00	0	0	0	0	1	3	1	5	1	1	1	0	0	0	13
03:00	0	0	0	0	0	2	5	0	0	0	0	0	0	0	7
04:00	0	0	0	0	0	3	3	0	0	0	0	0	0	0	6
05:00	0	0	0	0	0	0	2	1	2	1	0	0	0	0	6
06:00	0	0	0	0	1	2	4	8	5	2	0	0	0	0	22
07:00	0	0	0	2	4	13	18	14	9	3	2	1	0	0	66
08:00	0	0	0	2	0	7	36	58	29	6	0	0	0	0	138
09:00	0	0	0	6	5	16	34	60	26	7	5	0	0	0	159
10:00	0	0	0	5	6	15	39	45	13	4	0	0	0	0	127
11:00	0	0	0	7	2	19	43	41	13	4	0	0	0	0	129
12:00	0	0	0	1	10	18	40	48	13	6	1	0	0	0	137
13:00	0	0	1	3	13	24	54	61	37	7	2	0	0	0	202
14:00	1	0	1	5	5	26	54	62	27	10	1	0	0	0	192
15:00	1	0	0	6	7	27	94	78	32	9	0	1	0	0	255
16:00	0	0	1	9	25	43	110	95	53	10	1	0	0	0	347
17:00	0	1	1	10	13	71	120	116	47	6	2	1	0	0	388
18:00	0	0	0	12	30	79	191	143	62	5	3	1	0	0	526

DAY TOTAL	2	1	4	68	122	372	854	844	373	82	22	5	0	0	2749
PERCENTS	0.1%	0.1%	0.2%	2.5%	4.5%	13.6%	31.0%	30.7%	13.5%	2.9%	0.8%	0.1%	0.0%	0.0%	100%

Statistical Information...

15th Percentile Speed  
 32.9 mph

85th Percentile Speed  
 45.9 mph

Median Speed  
 39.7 mph

Average Speed  
 39.5 mph

10 MPH Pace Speed  
 35 mph to 45 mph  
 1698 vehicles in pace  
 Representing 61.7% of the total vehicles

Vehicles > 65 MPH  
 0  
 0.0%

# SPEED

MassDOT Highway Division  
SPEED SUMMARY  
Mon 6/1/2015

Page: 1

STA. 3 SB - LN. 1

Site Reference: 150140000818

Site ID: 110000000302

Location: RTE. 1A/LYNNWAY, BTWN NEWELL&WASHINGTON

Direction: ROAD TOTAL

File: SPD-302-L1.prn

City: LYNN

County: SPEED LN-1 SB

TIME	10	15	20	25	30	35	40	45	50	55	60	65	70	71+	Total
01:00	0	0	0	0	3	0	2	0	1	0	0	0	0	0	6
02:00	0	0	0	1	0	3	0	1	0	0	0	0	0	0	5
03:00	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
04:00	0	0	0	0	1	1	0	0	1	0	0	0	0	0	3
05:00	0	1	0	2	0	1	1	1	0	0	0	0	0	0	6
06:00	0	0	0	3	0	7	10	11	6	1	0	0	0	0	38
07:00	2	0	0	1	10	24	24	28	14	0	0	0	0	0	103
08:00	8	0	1	0	8	52	63	27	3	0	0	0	0	2	164
09:00	11	0	0	2	3	59	75	24	1	0	0	0	0	0	175
10:00	10	0	1	0	5	27	34	17	2	0	0	0	0	0	96
11:00	3	0	0	1	10	36	28	1	0	0	0	0	0	0	79
12:00	0	0	0	0	16	29	12	7	0	0	0	0	0	0	64
13:00	0	0	0	6	11	46	17	3	0	0	0	0	0	2	85
14:00	0	0	0	0	13	34	22	4	1	0	0	0	0	2	76
15:00	5	0	0	0	12	48	19	4	0	0	0	0	0	0	88
16:00	2	0	0	0	15	22	28	2	0	0	0	0	0	2	71
17:00	0	0	0	0	5	27	19	4	1	0	0	0	0	0	56
18:00	3	1	0	0	8	22	16	1	0	0	0	0	0	0	51
19:00	2	0	0	0	6	17	22	4	0	0	0	0	0	0	51
20:00	0	0	0	1	3	19	15	2	1	0	0	0	0	6	47
21:00	0	0	0	0	3	14	7	4	0	0	0	0	0	2	30
22:00	0	0	0	0	1	17	7	5	0	0	0	0	0	2	32
23:00	0	0	0	0	7	3	3	0	0	0	0	0	0	0	13
24:00	0	0	0	0	3	11	2	0	0	0	0	0	0	0	16

DAY TOTAL	46	2	2	17	143	519	426	150	31	1	0	0	0	18	1355
PERCENTS	3.4%	0.2%	0.2%	1.3%	10.6%	38.4%	31.4%	11.0%	2.2%	0.0%	0.0%	0.0%	0.0%	1.3%	100%

## Statistical Information...

15th Percentile Speed  
29.8 mph

85th Percentile Speed  
40.0 mph

Median Speed  
34.5 mph

Average Speed  
34.0 mph

10 MPH Pace Speed  
30 mph to 40 mph  
945 vehicles in pace  
Representing 69.7% of the total vehicles

Vehicles > 65 MPH  
18  
1.3%

MassDOT Highway Division  
 SPEED SUMMARY  
 Tue 6/2/2015

Page: 2

Site Reference: 150140000818

Site ID: 110000000302

Location: RTE. 1A/LYNWAY, BTWN NEWELL&WASHINGTON

Direction: ROAD TOTAL

File: SPD-302-L1.prn

City: LYNN

County: SPEED LN-1 SB

TIME	10	15	20	25	30	35	40	45	50	55	60	65	70	71+	Total
01:00	0	0	0	0	0	3	0	0	0	0	0	0	0	0	3
02:00	0	0	2	0	0	0	0	0	0	0	0	0	0	0	2
03:00	0	0	0	0	0	1	0	0	0	0	0	0	0	0	1
04:00	0	0	0	0	0	1	0	0	1	0	0	0	0	0	2
05:00	0	0	1	2	1	1	3	3	0	1	0	0	0	0	12
06:00	1	0	0	2	0	5	17	6	3	5	0	0	0	0	39
07:00	2	0	0	1	4	16	34	18	10	1	0	0	0	0	86
08:00	8	0	0	0	11	55	81	23	7	0	0	0	0	0	185
09:00	0	0	0	4	5	49	63	15	7	3	1	0	0	0	147
10:00	0	0	0	3	12	44	35	7	1	0	0	0	0	0	102
11:00	1	0	0	0	7	37	17	3	0	0	4	0	0	0	69
12:00	1	0	1	1	9	42	21	5	2	0	0	0	0	0	84
13:00	4	1	6	1	16	28	27	1	0	0	0	0	0	0	84
14:00	0	0	0	3	12	36	18	3	0	2	0	0	0	0	76
15:00	10	0	0	0	5	36	23	3	4	0	0	0	0	0	81
16:00	0	0	0	3	5	39	19	7	3	0	0	0	0	0	76
17:00	1	0	0	2	5	27	29	5	0	0	0	0	0	0	75
18:00	0	0	0	2	10	28	17	5	0	0	1	0	0	0	66
19:00	0	0	0	1	4	16	16	2	0	0	0	0	0	0	45
20:00	0	0	0	0	7	22	9	1	1	0	0	0	0	0	42
21:00	0	0	0	0	2	18	3	1	0	0	0	0	0	0	24
22:00	0	0	0	3	5	4	2	0	0	0	0	0	0	0	14
23:00	0	0	0	0	2	1	7	1	0	0	0	0	0	0	11
24:00	0	0	0	0	2	6	0	0	0	0	0	0	0	0	8

DAY TOTAL	28	1	10	28	124	515	441	109	39	12	6	0	0	21	1334
PERCENTS	2.1%	0.1%	0.8%	2.1%	9.3%	38.7%	33.1%	8.2%	2.9%	0.8%	0.4%	0.0%	0.0%	1.5%	100%

Statistical Information...

15th Percentile Speed  
 30.1 mph

Median Speed  
 34.6 mph

10 MPH Pace Speed  
 30 mph to 40 mph  
 956 vehicles in pace  
 Representing 71.6% of the total vehicles

85th Percentile Speed  
 39.9 mph

Average Speed  
 34.4 mph

Vehicles > 65 MPH  
 21  
 1.6%

MassDOT Highway Division  
 SPEED SUMMARY  
 Wed 6/3/2015

Page: 3

Site Reference: 150140000818

Site ID: 110000000302

Location: RTE. 1A/LYNNWAY, BTWN NEWELL&WASHINGTON

Direction: ROAD TOTAL

File: SPD-302-L1.prn

City: LYNN

County: SPEED LN-1 SB

TIME	10	15	20	25	30	35	40	45	50	55	60	65	70	71+	Total
01:00	0	0	1	0	0	1	1	1	0	0	0	0	0	0	4
02:00	0	0	0	0	3	0	1	1	0	0	0	0	0	0	5
03:00	0	0	0	0	1	1	0	0	0	0	0	0	0	0	2
04:00	0	0	0	0	0	0	0	0	1	0	0	0	0	0	1
05:00	0	0	0	2	1	3	1	0	0	0	0	0	0	0	7
06:00	0	0	1	0	9	7	3	0	0	1	0	0	0	2	23
07:00	7	3	0	2	4	26	34	28	6	0	0	0	0	2	112
08:00	4	2	0	0	22	72	61	18	1	0	0	0	0	0	180
09:00	5	0	0	4	5	26	22	8	1	0	0	0	0	0	71
10:00	2	0	0	0	5	45	31	12	5	0	0	0	0	2	102
11:00	1	0	0	3	9	27	25	5	5	0	0	0	0	0	75
12:00	0	0	1	4	16	25	19	2	1	0	0	0	0	0	68
13:00	1	0	0	1	4	25	20	7	0	7	0	0	0	0	65
14:00	1	0	0	3	4	29	22	11	3	0	0	0	0	0	73
15:00	3	0	1	3	10	28	20	5	1	3	0	0	0	0	74
16:00	0	0	4	0	22	37	21	3	0	0	0	0	0	0	87
17:00	5	0	0	0	12	41	31	6	4	0	0	0	0	0	99
18:00	0	1	0	0	19	24	31	9	3	0	0	0	0	0	87
19:00	1	0	0	1	6	22	29	7	0	0	0	0	0	0	66
20:00	0	0	0	1	7	10	15	1	0	0	0	0	0	0	34
21:00	0	0	1	1	11	13	7	0	0	1	0	0	0	0	34
22:00	0	1	0	1	0	9	10	1	1	0	0	0	0	0	23
23:00	0	0	0	0	1	2	7	1	0	0	0	0	0	0	11
24:00	0	0	0	0	0	4	5	2	0	1	0	0	0	0	12

DAY TOTAL	30	7	9	26	171	477	416	128	32	13	0	0	0	6	1315
PERCENTS	2.3%	0.6%	0.7%	2.0%	13.1%	36.3%	31.6%	9.7%	2.4%	0.9%	0.0%	0.0%	0.0%	0.4%	100%

Statistical Information...

15th Percentile Speed  
 28.7 mph

85th Percentile Speed  
 39.8 mph

Median Speed  
 34.4 mph

Average Speed  
 34.0 mph

10 MPH Pace Speed  
 30 mph to 40 mph  
 893 vehicles in pace  
 Representing 67.9% of the total vehicles

Vehicles > 65 MPH  
 6  
 0.5%

MassDOT Highway Division  
 SPEED SUMMARY  
 Thu 6/4/2015

Page: 4

Site Reference: 150140000818  
 Site ID: 110000000302  
 Location: RTE. 1A/LYNNWAY, BTWN NEWELL&WASHINGTON  
 Direction: ROAD TOTAL

File: SPD-302-L1.prn  
 City: LYNN  
 County: SPEED LN-1 SB

TIME	10	15	20	25	30	35	40	45	50	55	60	65	70	71+	Total
01:00	0	0	0	0	0	1	1	0	0	0	0	0	0	0	2
02:00	0	0	0	0	1	0	0	0	0	0	0	0	0	0	1
03:00	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
04:00	0	0	0	0	0	0	0	0	1	0	0	0	0	0	1
05:00	0	0	0	1	0	0	0	4	0	0	0	0	0	0	5
06:00	1	0	0	0	0	7	12	4	2	0	1	0	0	2	29
07:00	3	0	0	3	1	16	36	22	8	1	0	0	0	2	92
08:00	2	0	0	1	8	33	70	33	10	2	0	0	0	6	165
09:00	7	0	0	0	8	53	44	29	10	1	0	0	0	6	158
10:00	0	0	0	1	5	53	37	12	0	1	0	0	0	0	109
11:00	2	0	0	3	16	32	32	11	1	1	0	0	0	0	98
12:00	0	0	0	2	6	41	31	6	2	0	0	0	0	8	96
13:00	10	0	1	0	4	23	23	11	0	0	0	0	0	0	72
14:00	3	0	0	0	8	32	39	2	1	2	0	0	0	2	89
15:00	8	0	2	1	16	34	52	13	3	2	0	0	0	0	131
16:00	4	0	0	1	17	53	39	17	0	1	1	0	0	0	133
17:00	3	0	3	0	7	34	36	4	0	0	0	0	0	0	87
18:00	1	0	1	3	14	32	18	7	2	1	0	0	0	0	79

DAY TOTAL	44	0	7	16	111	444	470	175	40	12	2	0	0	26	1347
PERCENTS	3.3%	0.0%	0.6%	1.2%	8.3%	33.0%	34.9%	13.0%	2.9%	0.8%	0.1%	0.0%	0.0%	1.9%	100%

Statistical Information...

15th Percentile Speed  
 30.3 mph

85th Percentile Speed  
 41.5 mph

Median Speed  
 35.6 mph

Average Speed  
 34.8 mph

10 MPH Pace Speed  
 30 mph to 40 mph  
 914 vehicles in pace  
 Representing 67.8% of the total vehicles

Vehicles > 65 MPH  
 26  
 1.9%

# SPEED

MassDOT Highway Division  
SPEED SUMMARY  
Mon 6/1/2015

Page: 1

*STA. 3 SB - LN. 3*

Site Reference: 150140000747

Site ID: 330000000302

Location: RTE. 1A/LYNWAY, BTWN NEWELL&WASHINGTON

Direction: ROAD TOTAL

File: SPD-302-L3.prn

City: LYNN

County: SPEED LN-3 SB

TIME	10	15	20	25	30	35	40	45	50	55	60	65	70	71+	Total
01:00	0	0	0	0	0	3	8	1	2	2	0	0	0	0	16
02:00	0	0	0	0	0	1	3	3	0	0	0	0	0	0	7
03:00	0	0	0	0	0	0	2	3	2	2	0	0	0	0	9
04:00	0	0	0	0	0	3	2	3	3	1	0	0	0	0	12
05:00	0	0	0	0	0	1	13	28	17	7	1	0	0	0	67
06:00	0	0	0	0	0	8	47	144	91	17	3	0	0	0	310
07:00	0	0	0	0	0	21	268	353	141	9	1	0	0	0	793
08:00	0	0	0	0	9	106	342	274	66	10	1	0	0	0	808
09:00	0	0	0	0	10	64	288	264	47	5	0	0	0	0	678
10:00	0	0	0	0	6	44	192	153	57	4	5	0	0	0	461
11:00	0	0	0	0	6	37	118	126	38	8	0	0	0	0	333
12:00	1	0	0	0	1	42	109	107	45	5	0	0	0	0	310
13:00	0	0	0	0	1	39	113	103	38	3	0	0	0	0	297
14:00	0	0	0	1	4	23	100	103	40	3	0	0	0	0	274
15:00	0	0	0	0	3	33	90	92	50	8	0	0	0	0	276
16:00	0	0	0	1	1	24	87	117	41	11	5	0	0	0	287
17:00	1	0	0	0	1	38	94	88	32	5	0	0	0	0	259
18:00	0	0	0	0	5	31	118	92	30	4	0	0	0	0	280
19:00	0	0	0	0	1	13	75	78	24	7	1	0	0	0	199
20:00	0	0	0	0	0	16	56	38	23	0	0	1	1	0	135
21:00	0	0	0	0	2	15	62	31	9	2	0	0	0	0	121
22:00	0	0	0	0	4	10	38	27	7	2	0	0	0	0	88
23:00	0	0	0	0	1	13	23	20	6	1	0	0	0	0	64
24:00	0	0	0	0	0	5	17	7	3	0	0	0	0	0	32

DAY TOTAL	2	0	0	2	55	590	2265	2255	812	116	17	1	1	0	6116
PERCENTS	0.1%	0.0%	0.0%	0.1%	0.9%	9.7%	37.1%	36.9%	13.2%	1.8%	0.2%	0.0%	0.0%	0.0%	100%

Statistical Information...

15th Percentile Speed  
35.6 mph

85th Percentile Speed  
45.2 mph

Median Speed  
40.3 mph

Average Speed  
40.4 mph

10 MPH Pace Speed  
35 mph to 45 mph  
4520 vehicles in pace  
Representing 73.9% of the total vehicles

Vehicles > 65 MPH  
1  
0.0%

MassDOT Highway Division  
 SPEED SUMMARY  
 Tue 6/2/2015

Page: 2

Site Reference: 150140000747

Site ID: 330000000302

Location: RTE. 1A/LYNWAY, BTWN NEWELL&WASHINGTON

Direction: ROAD TOTAL

File: SPD-302-L3.prn

City: LYNN

County: SPEED LN-3 SB

TIME	10	15	20	25	30	35	40	45	50	55	60	65	70	71+	Total
01:00	0	0	0	0	0	2	6	1	1	0	0	0	0	0	10
02:00	0	0	0	0	0	1	4	0	1	0	0	0	0	0	6
03:00	0	0	0	0	0	1	2	2	1	0	0	0	0	0	6
04:00	0	0	0	0	0	4	1	4	2	0	1	0	0	0	12
05:00	0	0	0	0	0	2	10	19	11	3	1	0	0	0	46
06:00	0	0	0	0	0	16	79	133	57	11	4	0	0	0	300
07:00	0	0	0	0	0	33	277	349	106	14	1	0	0	0	780
08:00	0	0	0	0	1	53	328	328	68	6	1	0	0	0	785
09:00	1	0	0	0	0	43	329	304	70	5	0	0	0	0	752
10:00	0	0	0	0	4	66	178	173	39	2	1	0	0	0	463
11:00	0	0	0	0	2	34	135	104	44	10	3	0	0	0	332
12:00	0	0	0	1	2	27	90	112	33	4	0	1	0	0	270
13:00	0	0	0	2	5	47	125	103	21	7	0	0	0	1	311
14:00	0	0	0	0	2	27	82	120	31	4	2	0	0	0	268
15:00	0	0	0	0	2	40	125	107	29	6	0	0	0	0	309
16:00	0	0	0	0	5	29	96	101	35	10	2	0	0	0	278
17:00	0	0	0	0	3	46	101	133	31	5	0	0	0	0	319
18:00	1	0	0	1	2	13	95	117	31	10	1	1	0	0	272
19:00	0	0	0	0	5	24	74	66	23	6	1	1	0	0	200
20:00	0	0	0	0	0	20	49	60	19	10	0	1	0	0	159
21:00	0	0	0	0	1	15	42	44	10	6	0	0	1	0	119
22:00	0	0	0	0	1	10	42	30	16	4	0	1	0	0	104
23:00	0	0	0	0	0	6	24	33	7	1	1	0	0	0	72
24:00	0	0	0	0	1	1	16	13	6	0	0	1	0	0	38

DAY TOTAL	2	0	0	4	36	560	2310	2456	692	124	19	6	1	1	6211
PERCENTS	0.1%	0.0%	0.0%	0.1%	0.6%	9.1%	37.2%	39.6%	11.1%	1.9%	0.3%	0.0%	0.0%	0.0%	100%

Statistical Information...

15th Percentile Speed  
 35.7 mph

85th Percentile Speed  
 44.8 mph

Median Speed  
 40.4 mph

Average Speed  
 40.5 mph

10 MPH Pace Speed  
 35 mph to 45 mph  
 4766 vehicles in pace  
 Representing 76.7% of the total vehicles

Vehicles > 65 MPH  
 2  
 0.0%

MassDOT Highway Division  
SPEED SUMMARY  
Wed 6/3/2015

Page: 3

Site Reference: 150140000747

Site ID: 330000000302

Location: RTE. 1A/LYNWAY, BTWN NEWELL&WASHINGTON

Direction: ROAD TOTAL

File: SPD-302-L3.prn

City: LYNN

County: SPEED LN-3 SB

TIME	10	15	20	25	30	35	40	45	50	55	60	65	70	71+	Total
01:00	0	0	0	0	0	0	8	5	3	0	0	0	0	0	16
02:00	0	0	0	0	0	1	3	1	5	0	0	0	0	0	10
03:00	0	0	0	0	0	1	0	3	1	0	0	0	0	0	5
04:00	0	0	0	0	0	1	0	2	2	2	1	0	0	0	8
05:00	0	0	0	1	0	1	9	19	18	9	3	0	0	0	60
06:00	0	0	0	0	1	0	19	112	128	37	7	0	1	0	305
07:00	1	0	0	0	4	121	327	215	84	10	0	1	0	0	763
08:00	3	0	0	1	18	256	386	151	24	0	0	1	0	0	840
09:00	12	14	8	18	27	145	298	184	32	1	0	0	0	0	739
10:00	0	0	0	0	8	64	247	179	47	3	0	0	0	0	548
11:00	1	0	0	0	5	52	204	128	38	3	1	0	0	0	432
12:00	0	0	0	0	4	41	125	123	45	3	2	1	0	0	344
13:00	0	0	0	0	3	45	104	100	45	8	2	1	0	0	308
14:00	0	0	0	0	2	21	104	129	49	8	0	0	0	0	313
15:00	0	0	0	2	5	41	140	87	31	6	0	0	0	0	312
16:00	0	0	0	0	3	39	120	118	53	11	1	0	0	0	345
17:00	0	0	0	0	7	28	101	121	48	13	1	0	0	0	319
18:00	0	0	0	0	2	30	121	112	58	7	0	0	0	0	330
19:00	0	0	0	2	6	43	101	80	23	5	1	0	1	0	262
20:00	0	0	0	1	4	38	87	60	19	5	0	0	0	0	214
21:00	0	0	0	0	5	25	66	48	16	5	0	1	0	0	166
22:00	0	0	0	1	1	19	49	50	17	1	0	0	0	1	139
23:00	0	0	0	1	3	5	31	23	19	5	1	0	0	0	88
24:00	0	0	0	0	0	0	5	15	16	7	1	0	0	0	44

DAY TOTAL	17	14	8	27	108	1022	2665	2066	812	143	20	5	2	1	6910
PERCENTS	0.3%	0.3%	0.2%	0.4%	1.6%	14.8%	38.6%	29.9%	11.7%	2.0%	0.2%	0.0%	0.0%	0.0%	100%

Statistical Information...

15th Percentile Speed  
34.2 mph

Median Speed  
39.2 mph

10 MPH Pace Speed  
35 mph to 45 mph  
4731 vehicles in pace  
Representing 68.4% of the total vehicles

85th Percentile Speed  
44.9 mph

Average Speed  
39.5 mph

Vehicles > 65 MPH  
3  
0.0%

MassDOT Highway Division  
 SPEED SUMMARY  
 Thu 6/4/2015

Page: 4

Site Reference: 150140000747

Site ID: 330000000302

Location: RTE. 1A/LYNNWAY, BTWN NEWELL&WASHINGTON

Direction: ROAD TOTAL

File: SPD-302-L3.prn

City: LYNN

County: SPEED LN-3 SB

TIME	10	15	20	25	30	35	40	45	50	55	60	65	70	71+	Total
01:00	0	0	0	0	0	3	5	3	3	0	0	0	0	0	14
02:00	0	0	0	0	1	2	0	3	0	0	0	0	0	0	6
03:00	0	0	0	1	1	4	4	5	1	0	0	0	0	0	16
04:00	0	0	0	0	0	0	4	2	5	1	1	0	0	0	13
05:00	0	0	0	0	0	1	14	24	15	11	0	0	0	0	65
06:00	0	0	0	0	0	2	18	109	121	33	6	0	0	0	289
07:00	1	0	0	0	0	46	180	330	191	28	1	0	0	0	777
08:00	0	0	0	0	1	59	264	347	129	14	0	0	0	0	814
09:00	0	0	0	0	2	48	257	331	101	15	4	1	0	0	759
10:00	0	0	0	0	3	37	165	201	77	15	1	0	0	0	499
11:00	0	0	0	0	8	45	145	130	46	11	0	0	0	0	385
12:00	1	0	0	0	4	37	122	144	52	7	1	0	0	0	368
13:00	0	0	0	0	2	28	123	126	57	7	3	2	0	0	348
14:00	0	0	0	0	7	40	114	114	47	11	0	0	0	0	333
15:00	1	0	0	1	2	31	104	135	45	11	1	0	0	0	331
16:00	0	0	0	0	3	28	117	135	53	9	1	1	0	0	347
17:00	0	0	1	0	2	52	126	120	40	5	1	0	0	0	347
18:00	0	0	0	0	3	47	125	106	44	11	1	0	0	0	337

DAY TOTAL	3	0	1	2	39	510	1887	2365	1027	189	21	4	0	0	6048
PERCENTS	0.1%	0.0%	0.1%	0.1%	0.7%	8.4%	31.2%	39.1%	16.9%	3.1%	0.3%	0.0%	0.0%	0.0%	100%

Statistical Information...

15th Percentile Speed  
 35.9 mph

85th Percentile Speed  
 46.6 mph

Median Speed  
 41.2 mph

Average Speed  
 41.2 mph

10 MPH Pace Speed  
 35 mph to 45 mph  
 4252 vehicles in pace  
 Representing 70.3% of the total vehicles

Vehicles > 65 MPH  
 0  
 0.0%



# **APPENDIX C**

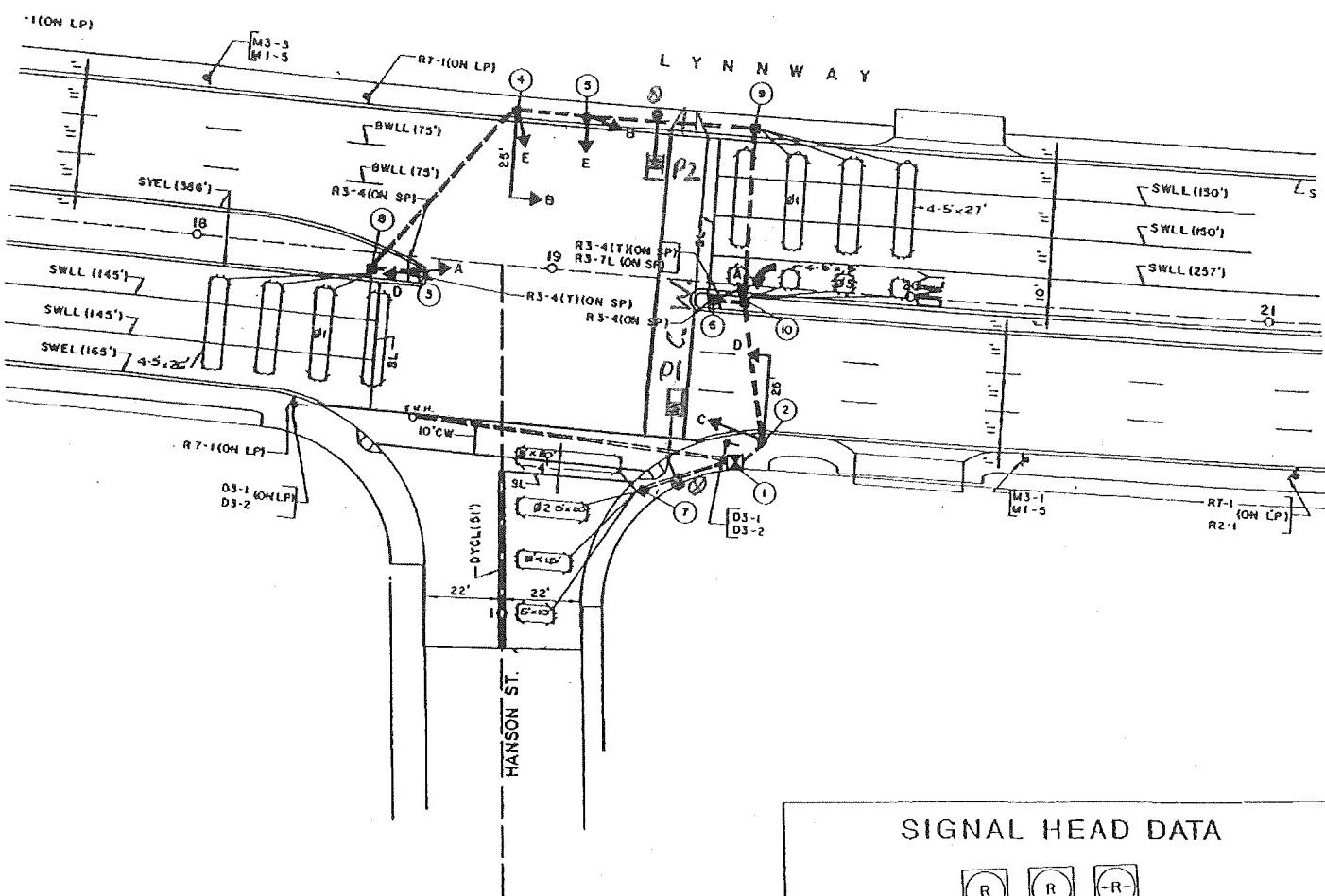
## **Traffic Signal Timing and Layout Information**

## TRAFFIC SIGNAL LAYOUT

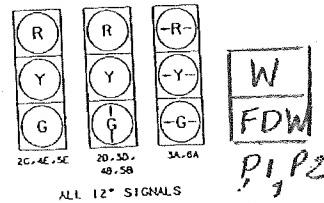
LYNNWAY AT HANSON ST - LYNN

SCALE: 1" - 50' TRAFFIC CONTROL DEVICE NO. 234

DATE: May 8, 2012



## SIGNAL HEAD DATA



## LEGEND

- |                   |  |                  |  |
|-------------------|--|------------------|--|
| VEHICLE SIGNAL    |  | WOODEN POLE      |  |
| PEDESTRIAN SIGNAL |  | SIGNAL POST      |  |
| CONTROL CABINET   |  | MAST ARM         |  |
| LOOP DETECTOR     |  | PULL BOX         |  |
| MAGNETIC DETECTOR |  | CONDUIT          |  |
| PED. PUSH BUTTON  |  | OVERHEAD CABLE   |  |
| TRAFFIC SIGN      |  | ELECTRIC MANHOLE |  |

## NOTES

## COMMONWEALTH OF MASSACHUSETTS

## DEPARTMENT OF CONSERVATION AND RECREATION

## TRAFFIC SIGNAL SEQUENCE AND TIMING

## LYNNWAY AT HANSON STREET, LYNN

DATE: 5/8/2012

TRAFFIC CONTROL DEVICE NO. <u>234</u>	SIGNAL NUMBER	1			2			3			4			FLASHING OPERATION	<u>LEGEND</u>
		1	2	3	4	5	6	7	8	9	10	11	12		
LYNNWAY (N.B.)	2D,3D	GVA	Y	R	R	R	R	R	R	R				FY	
LYNNWAY (S.B.)	2C	G	Y	R	R	R	R	R	R	R				FY	
LYNNWAY (S.B.)	3A,6A	RLA	RLA	RLA	RLA	RLA	RLA	GLA	YLA	RLA				FR (LA)	
LYNNWAY (S.B.)	4B,5,B	GVA	Y*	R*	R	R	R	GVA	Y*	R*				FY	
HANSON ST. (W.B.)	4E, 5E	R	R	R	G	Y	R	R	R	R				FR	
PEDESTRIAN	P1, P2	DW	DW	DW	W/FDW	DW	DW	DW	DW	DW				OUT	
															SUPERCEDES SEQUENCE AND TIMING DATED: <u>3-Jan-91</u>
SECONDS PER ACTUATION															<u>NOTES</u>
TIME BEFORE REDUCTION															
TIME TO REDUCE															
MINIMUM GAP															
MINIMUM GREEN		7			7			7							
PASSAGE		2			2			2							
MAXIMUM GREEN 1		90			40			40							
MAXIMUM GREEN 2		1			40			40							
CLEARANCE		3	2		3	2		3	1						
WALK					7										
PED. CLEARANCE					23										
RECALL		OFF		OFF		OFF									
DETECTION		NON-LOCK		NON-LOCK		NON-LOCK									

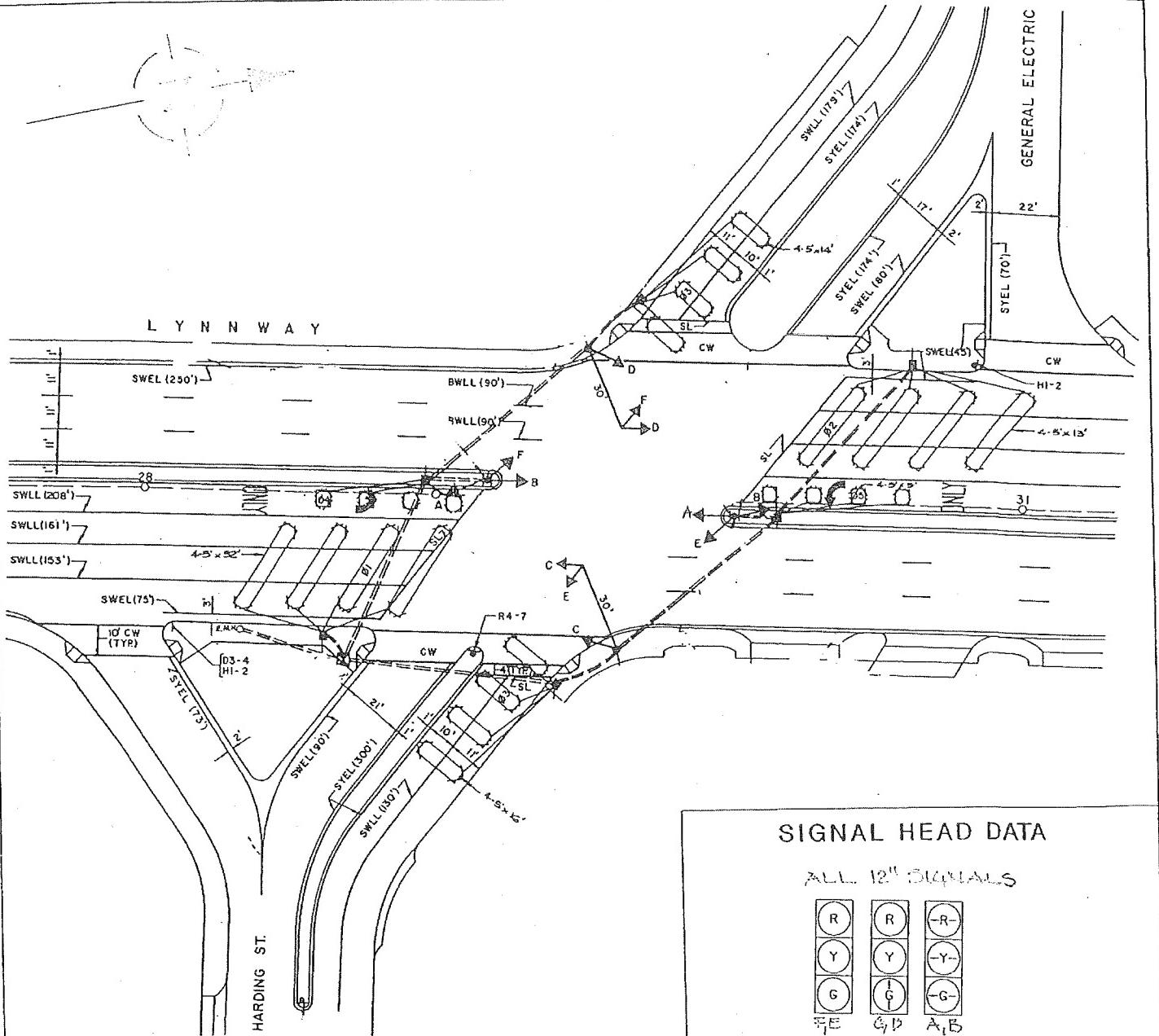
Controller shall rest in RED in the absence of  
servicable call

\* If assigned right of way is to remain in effect  
during the next phase the signal indication  
for that traffic movement will not change during  
the clearance interval

## TRAFFIC SIGNAL LAYOUT

*Lynn Way at Harding & A.B. Drive, Boston*  
 SCALE: 1" = 50' TRAFFIC CONTROL DEVICE NO. 205

DATE: Jan 2, 1969

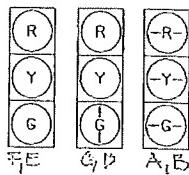


## LEGEND

VEHICLE SIGNAL	→	WOODEN POLE
PEDESTRIAN SIGNAL	—	SIGNAL POST
CONTROL CABINET	☒	MAST ARM
LOOP DETECTOR	□	PULL BOX
MAGNETIC DETECTOR	Ⓜ	CONDUIT
PED. PUSH BUTTON	⊗	OVERHEAD CABLE
TRAFFIC SIGN	↓	ELECTRIC MANHOLE O <sub>E.M.H.</sub>

## NOTES

ALL 12" SIGNALS



# COMMONWEALTH OF MASSACHUSETTS

# METROPOLITAN DISTRICT COMMISSION

## TRAFFIC SIGNAL SEQUENCE AND TIMING

## LYNNWAY AT HARDING ST. G.E. DRIVEWAY - LYNN

DATE: OCTOBER 5, 2001

## COORDINATION DATA SHEET

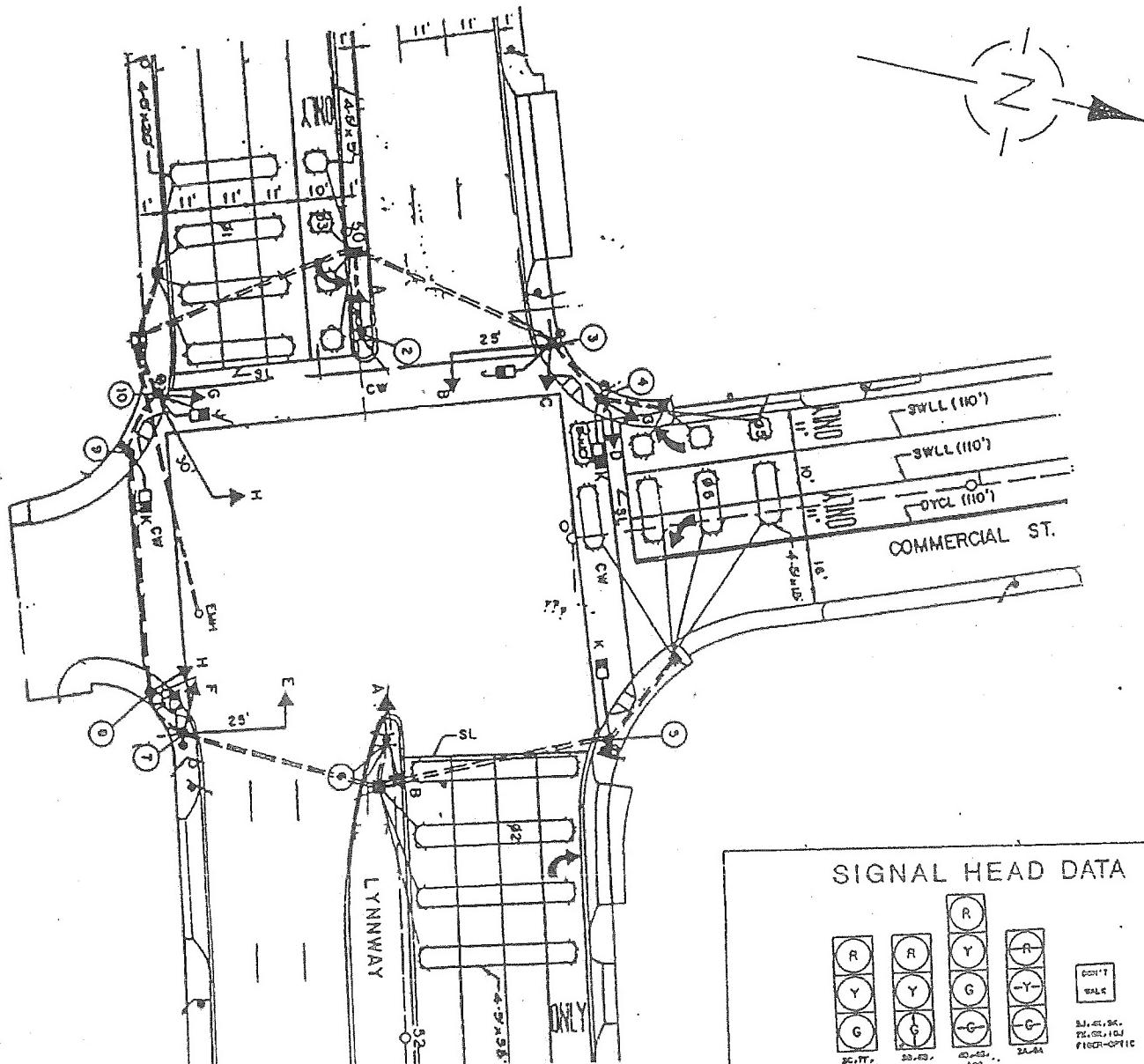
	DIAL 1	DIAL 2	DIAL 3	DIAL 4
CYCLE LENGTH	120	120	90	
OFFSET	81	28	31	
YIELD POINT	73	65	40	
FORCE - OFF O3	81	79	71	
FORCE - OFF O4 & 5	95	95	93	
	6:00-10:00AM	4:00-8:00PM	10:00AM-4:00PM	8:00PM-6:00AM

# TRAFFIC SIGNAL LAYOUT

## LYNNWAY AT COMMERCIAL STREET, LYNN

ALE: 1° = 40' TRAFFIC CONTROL DEVICE NO. 202

DATE: \_\_\_\_\_

**LEGEND**

VEHICLE SIGNAL	—	WOODEN POLE	○
PEDESTRIAN SIGNAL	—	SIGNAL POST	●
CONTROL CABINET	[x]	MAST ARM	—
LOOP DETECTOR	[□]	PULL BOX	□
MAGNETIC DETECTOR	[M]	CONDUIT	-----
ED. PUSH BUTTON	(X)	OVERHEAD CABLE	— —
TRAFFIC SIGN	↑	ELECTRIC MANHOLE	○ E.M.H.

**NOTES**

COMMONWEALTH OF MASSACHUSETTS

METROPOLITAN DISTRICT COMMISSION

## TRAFFIC SIGNAL SEQUENCE AND TIMING

LYNNWAY AT COMMERCIAL STREET, LYNN

DATE: April 4, 1986

TRAFFIC CONTROL DEVICE NO. NO. 202	SIG. NO.	1			2			3			4			5			6			7			FLASH	LE END			
		1	2	3	4	5	6	7	8	9	10	11	12	13	14	15	16	17	18	19	20	21	22	23	24		
LYNNWAY (EB)	2A,6A	RLA	RLA	RLA	RLA	RLA	RLA	GLA	YLA					RLA	RLA	RLA										FR (LA)	R = RED
LYNNWAY (EB)	7E	GVA	Y	R	R	R	R	R	R	R	R	R	R	R	R	R	R	R	R							FY	Y = YELLOW
LYNNWAY (EB)	7F	G	Y	R	R	R	R	R	R	R	R	R	R	R	R	R	R	R	R							FY	G = GREEN
LYNNWAY (WB)	3B,6B	R	R	R	GVA	Y	R	R	R	R	R	R	R	R	R	R	R	R	R							FY	W = WHITE
LYNNWAY (WB)	3C	R	R	R	G	Y	R	R	R	R	R	R	R	R	R	R	R	R	R							FDW = DONT WALK	
LYNNWAY (WB)	4D	R	R	R	G(1)	Y	R	R	R	R	R	R	R	R	R	R	R	R	R							FY	FDW = FLASHING DONT WALK
COMMERCIAL STREET (SB)	10E,8H	R	R	R	R	R	R	R	R	R	R	R	R	G	Y	R										FR	FY = FLASHING YELLOW
COMMERCIAL STREET (SB)	4G,10G	R	R	R	R	R	R	GRA	Y	R				G(1)	Y	R										FR	YR = FLASHING RED
PEDESTRIANS (N-S)	3J,10J	DW	DW	DW	DW	DW	DW	DW	DW	DW				H(1)	DW	DW									OUT	VA = VERTICAL ARROW	
PEDESTRIANS (E-W)	7K,9K	W(3) FDW(2)	DW	DW	DW	DW	DW	DW	DW	DW				DW	DW	DW									OUT	LA = LEFT ARROW	
PEDESTRIANS (E-W)	4K,5K	DW	DW	DW	W(3) FDW(2)	DW	DW	DW	DW	DW				DW	DW	DW									OUT	RA = RIGHT ARROW	
SECONDS PER ACTUATION																										SUPERSEQUENCE	
TIME BEFORE REDUCTION																										SEPTEMBER 17, 1981	
TIME TO REDUCE																											
MINIMUM GAP																											
MINIMUM GREEN		7		7		7								7													
PASSAGE		2		2		2								2													
MAXIMUM GREEN 1 (Free Operation)		60		60		50								30													
MAXIMUM GREEN 2 (Coordination mode)		1		1		50								30													
CLEARANCE		3	1		3	1		3	1					3	1												
WALK		7		7										7													
PED. CLEARANCE		16		16										17													
RECALL		OFF		OFF		OFF								OFF													
DETECTION		NON-LOCK		NON-LOCK		NON-LOCK								NON-LOCK													COORDINATION DATA SHEET ATTACHED

LYNDHURST AT COMMERCIAL STREET, LYNN

COORDINATION DATA SHEET:

	DIAL 1	DIAL 2	PLAN 3	DIAL 4
CYCLE LENGTH	120	120	90	
OFFSET	37	23	91	
YIELD POINT	60	35	40	
FORCE - OFF $\phi 1 + \phi 3$	83	77	77	
FORCE - OFF $\phi 5$	97	97	96	
	6:00AM - 10:00AM	4:00PM - 8:00PM	10:00AM - 4:00PM	6:00PM - 6:00AM

FREE  
OPERATION

# COMMONWEALTH OF MASSACHUSETTS

# METROPOLITAN DISTRICT COMMISSION

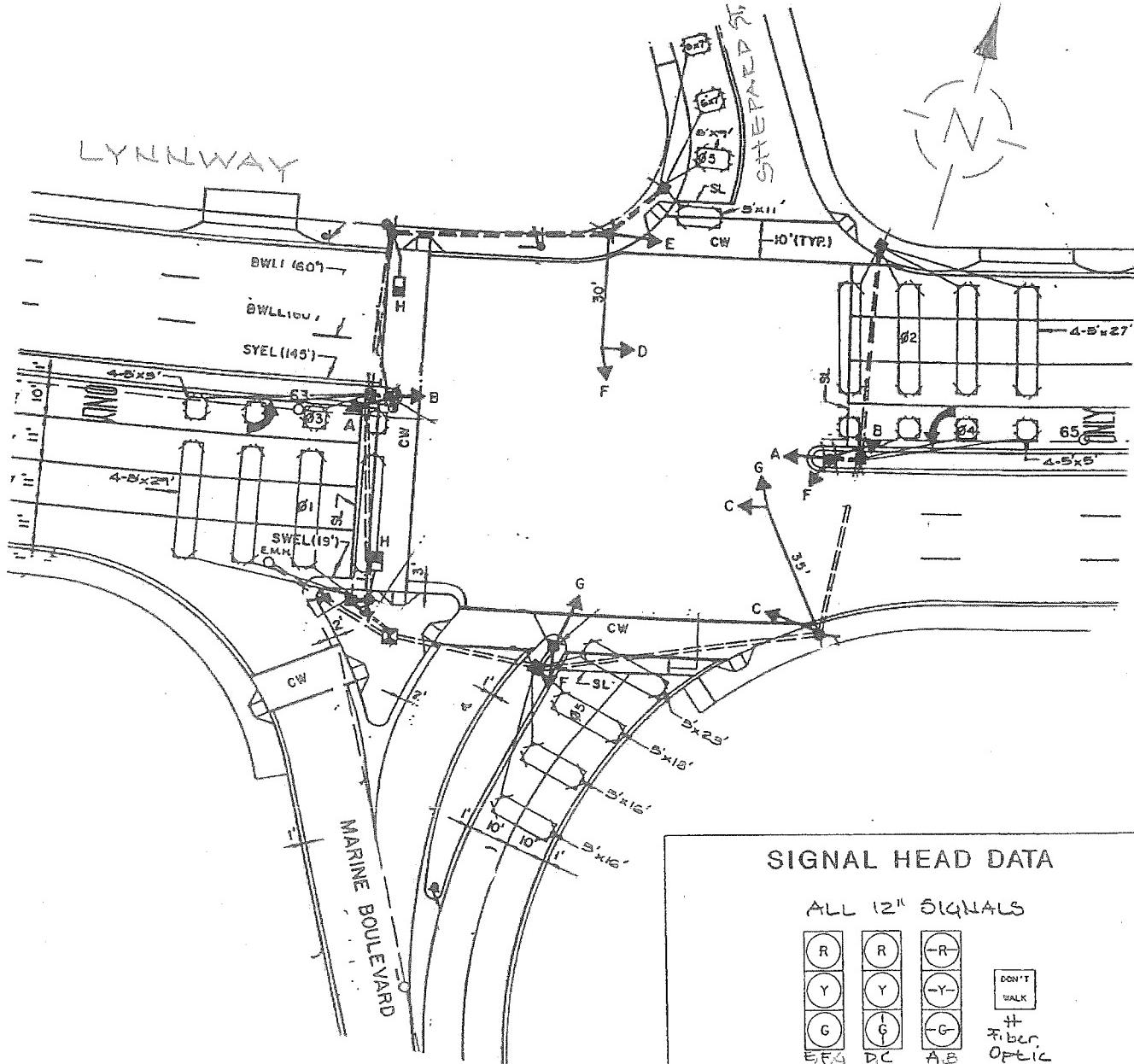
## **TRAFFIC SIGNAL LAYOUT**

LYNNWAY AT MARINE BLVP & SHEPARD ST. - LYNN

SCALE: 1" = 40

TRAFFIC CONTROL DEVICE NO. 236

DATE: Jan 3, 1991



## LEGEND

- |                   |  |                  |  |
|-------------------|--|------------------|--|
| VEHICLE SIGNAL    |  | WOODEN POLE      |  |
| PEDESTRIAN SIGNAL |  | SIGNAL POST      |  |
| CONTROL CABINET   |  | MAST ARM         |  |
| LOOP DETECTOR     |  | PULL BOX         |  |
| MAGNETIC DETECTOR |  | CONDUIT          |  |
| PED. PUSH BUTTON  |  | OVERHEAD CABLE   |  |
| TRAFFIC SIGN      |  | ELECTRIC MANHOLE |  |

## NOTES

ALL 12" SIGNALS

R	R	-R
Y	Y	-Y
G	G	-G
E,F,A	D,C	A,B

DON'T  
SALK

fiber.  
Optic

COMMONWEALTH OF MASSACHUSETTS

METROPOLITAN DISTRICT COMMISSION

## TRAFFIC SIGNAL SEQUENCE AND TIMING

LYNNWAY AT MARINE BLVD. AND SHEPARD STREET - LYNN

DATE: JANUARY 3, 1991

TRAFFIC CONTROL DEVICE NO.	SIG. NO.	1	2	3	4	5	6	7	8	9	10	11	12	13	14	15	16	17	18	19	20	21	22	23	24	FLASH. OPER.	LEGEND
LYNNWAY (EB)	A	RLA	RLA	RLA	RLA	RLA	GLA	YLA	RLA	RLA	RLA	RLA	RLA	RLA	RLA	RLA	RLA	RLA	RLA	RLA	RLA	RLA	RLA	RLA	FR(LA)	R = RED	
LYNNWAY (EB)	C	GVA	Y	R	R	R	R	R	R	R	R	R	R	R	R	R	R	R	R	R	R	R	R	R	FY	Y = YELLOW	
LYNNWAY (WB)	B	RLA	RLA	RLA	RLA	RLA	RLA	RLA	RLA	RLA	GLA	YLA	RLA	RLA	RLA	RLA	RLA	RLA	RLA	RLA	RLA	RLA	RLA	RLA	FR(LA)	G = GREEN	
LYNNWAY (WB)	D	R	R	R	GVA	Y	R	R	R	R	R	R	R	R	R	R	R	R	R	R	R	R	R	R	FY	W = WALK	
LYNNWAY (WB)	E	R	R	R	G	Y	R	R	R	R	R	R	R	R	R	R	R	R	R	R	R	R	R	FY	DW = DONT WALK		
MARINE BLVD (NB)	F	R	R	R	R	R	R	R	R	R	R	R	R	R	R	R	R	R	G	Y	R			FDW = FLASH DONT WALK			
SHEPARD STREET (SB)	G	R	R	R	R	R	R	R	R	R	R	R	R	R	R	R	G	Y	R					FR = FLASHING YELLOW			
CROSSWALK (N-S)	H	DW	DW	DW	DW	DW	DW	DW	DW	DW	DW	OUT	FR = FLASHING RED														
(1) "DW" IF PEDS NOT ACTUATED																									VA = VERTICAL ARROW		
SECONDS PER ACTUATION																									LA = LEFT ARROW		
TIME BEFORE REDUCTION																									RA = RIGHT ARROW		
TIME TO REDUCE																									SUPERSEDES SEQUENCE AND TIMING DATED:  _____		
MINIMUM GAP																									NOTES:		
MINIMUM GREEN	7		7			5			7			7													CONTROLLER SHALL REST IN RED IN THE ABSENCE OF SERVICEABLE CALLS.		
PASSAGE	2		2			2			2			2															
MAXIMUM GREEN 1 (Free Operation)	90		90			20			20			20															
MAXIMUM GREEN 2 (Coordination mode)	1		1			20			20			20															
CLEARANCE		3	2		3	2		3	2		3	2			4	2											
WALK															7												
PED. CLEARANCE															14												
RECALL		OFF		OFF		OFF		OFF		OFF		OFF		OFF													
DETECTION		NON-LOCK		NON-LOCK		NON-LOCK		NON-LOCK		NON-LOCK		NON-LOCK		NON-LOCK											COORDINATION DATA SHEET ATTACHED.		

**LYNNWAY AT MARINE BLVD. AND SHEPARD STREET - LYNN**

**COORDINATION DATA SHEET:**

	DIAL 1	DIAL 2	PLAN 3	DIAL 4
CYCLE LENGTH(SEC)	120	120	90	
OFFSET	91	76	30	
YIELD POINT	71	69	70	
FORCE - OFF $\phi 3 + 4$	81	84	82	
FORCE - OFF $\phi 5$	95	95	93	
	6:00AM - 10:00AM	4:00PM - 8:00PM	10:00AM - 4:00PM	8:00PM - 6:00AM

**FREE OPERATION**

## TRAFFIC SIGNAL LAYOUT

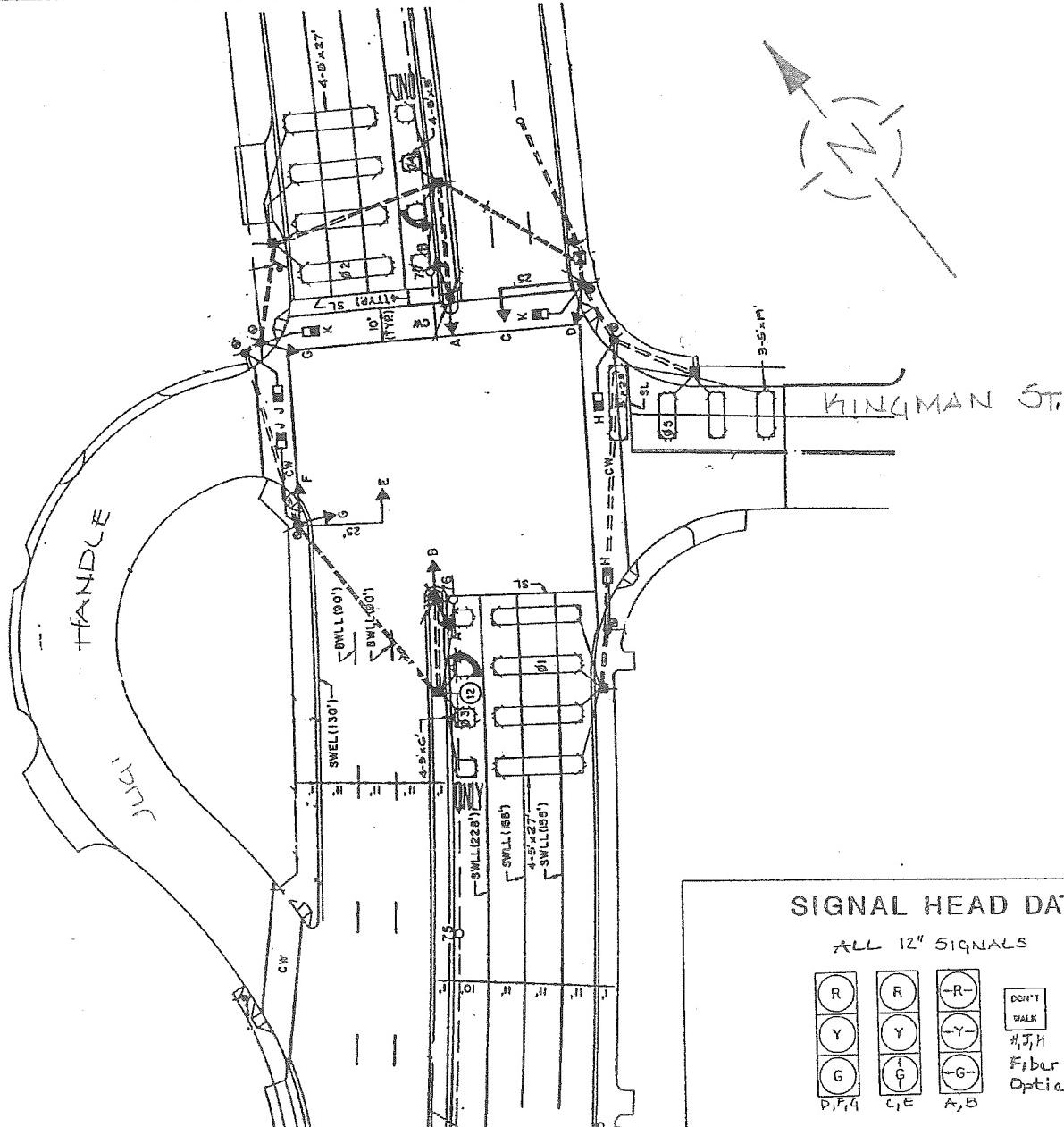
LYNNWAY AT KINGMAN ST LYNN

SCALE: 1" = 50'

TRAFFIC CONTROL DEVICE NO.

237

DATE: JAN 3, 1991



## LEGEND

VEHICLE SIGNAL	→	WOODEN POLE	○
PEDESTRIAN SIGNAL	—■—	SIGNAL POST	●
CONTROL CABINET	[x]	MAST ARM	○—
LOOP DETECTOR	[□]	PULL BOX	□
MAGNETIC DETECTOR	[M]	CONDUIT	-----
PED. PUSH BUTTON	(X)	OVERHEAD CABLE	— —
TRAFFIC SIGN	↓	ELECTRIC MANHOLE	○ E.M.H.

## NOTES

COMMONWEALTH OF MASSACHUSETTS

METROPOLITAN DISTRICT COMMISSION

TRAFFIC SIGNAL SEQUENCE AND TIMING  
LYNNWAY AT KINGMAN STREET - LYNN

DATE: JANUARY 3, 1991

TRAFFIC CONTROL DEVICE NO.	SIG. NO.	FLASH																								LEGEND	
		1	2	3	4	5	6	7	8	9	10	11	12	13	14	15	16	17	18	19	20	21	22	23	24		
LYNNWAY (NB)	A	RLA	RLA	RLA	RLA	RLA	GLA	YLA	RLA	RLA	RLA	RLA	RLA	RLA	RLA	RLA	RLA	RLA	RLA	RLA	RLA	RLA	RLA	RLA	RLA	FR(LA)	
LYNNWAY (NB)	C	GVA	Y	R	R	R	R	R	R	R	R	R	R	R	R	R	R	R	R	R	R	R	R	R	R	FY	
LYNNWAY (NB)	D	G	Y	R	R	R	R	R	R	R	R	R	R	R	R	R	R	R	R	R	R	R	R	R	R	FY	
LYNNWAY (SB)	B	RLA	RLA	RLA	RLA	RLA	RLA	RLA	RLA	RLA	GLA	YLA	RLA	RLA	RLA	RLA	RLA	RLA	RLA	RLA	RLA	RLA	RLA	RLA	RLA	FR(LA)	
LYNNWAY (SB)	E	R	R	R	GVA	Y	R	R	R	R	R	R	R	R	R	R	R	R	R	R	R	R	R	R	R	FY	
LYNNWAY (SB)	F	R	R	R	G	Y	R	R	R	R	R	R	R	R	R	R	R	R	R	R	R	R	R	R	R	FY	
KINGMAN ST.(WB)	G	R	R	R	R	R	R	R	R	R	R	R	R	R	R	R	G	Y	R							FR	
CROSSWALK (N-S)	H	W(1)/ FDW(1)	DW	DW	DW	DW	DW	DW	DW	DW	DW	DW	DW	DW	DW	DW	DW	DW	DW	DW	DW	DW	DW	DW	DW	OUT	
CROSSWALK (N-S)	J	DW	DW	DW	W(1)/ FDW(1)	DW	DW	DW	DW	DW	DW	DW	DW	DW	DW	DW	DW	OUT									
CROSSWALK (E-W)	K	DW	DW	DW	DW	DW	DW	DW	DW	DW	DW	DW	DW	DW	DW	W(1)/ FDW(1)	DW	DW	DW	DW	DW	DW	DW	DW	DW	OUT	
(1) "DW" IF PEDS NOT ACTUATED																										SUPERSEDES SEQUENCE AND TIMING DATED:	
SECONDS PER ACTUATION																										NOTES:	
TIME BEFORE REDUCTION																										CONTROLLER SHALL REST IN RED IN THE ABSENCE OF SERVICEABLE CALLS.	
TIME TO REDUCE																											
MINIMUM GAP																											
MINIMUM GREEN	7			7			7			7			7			7			7			7			7		
PASSAGE	2			2			2			2			2			2			2			2			2		
MAXIMUM GREEN 1 (Free Operation)	99			99			20			20			20			30			30			30			30		
MAXIMUM GREEN 2 (Coordination mode)	1			1			20			20			20			30			30			30			30		
CLEARANCE		3	1		3	1		3	1		3	1		3	1		3	1		3	1		3	1			
WALK	7			7													7										
PED. CLEARANCE	16			16													16										
RECALL		OFF		OFF		OFF		OFF		OFF		OFF		OFF		OFF		OFF		OFF		OFF		OFF		OFF	
DETECTION		NON-LOCK		NON-LOCK		NON-LOCK		NON-LOCK		NON-LOCK		NON-LOCK		NON-LOCK		NON-LOCK		NON-LOCK		NON-LOCK		NON-LOCK		NON-LOCK		NON-LOCK	COORDINATION DATA SHEET ATTACHED.

**LYNNWAY AT KINGMAN STREET - LYNN**

**COORDINATION DATA SHEET:**

	DIAL 1	DIAL 2	PLAN 3	DIAL 4
CYCLE LENGTH(SEC)	120	120	90	
OFFSET	78	22	33	FREE OPERATION
YIELD POINT	76	76	67	
FORCE - OFF $\phi 3 \div 4$	89	89	80	
FORCE - OFF $\phi 5$	97	97	96	
	6:00AM - 10:00AM	4:00PM - 8:00PM	10:00AM - 4:00PM	8:00PM - 6:00AM

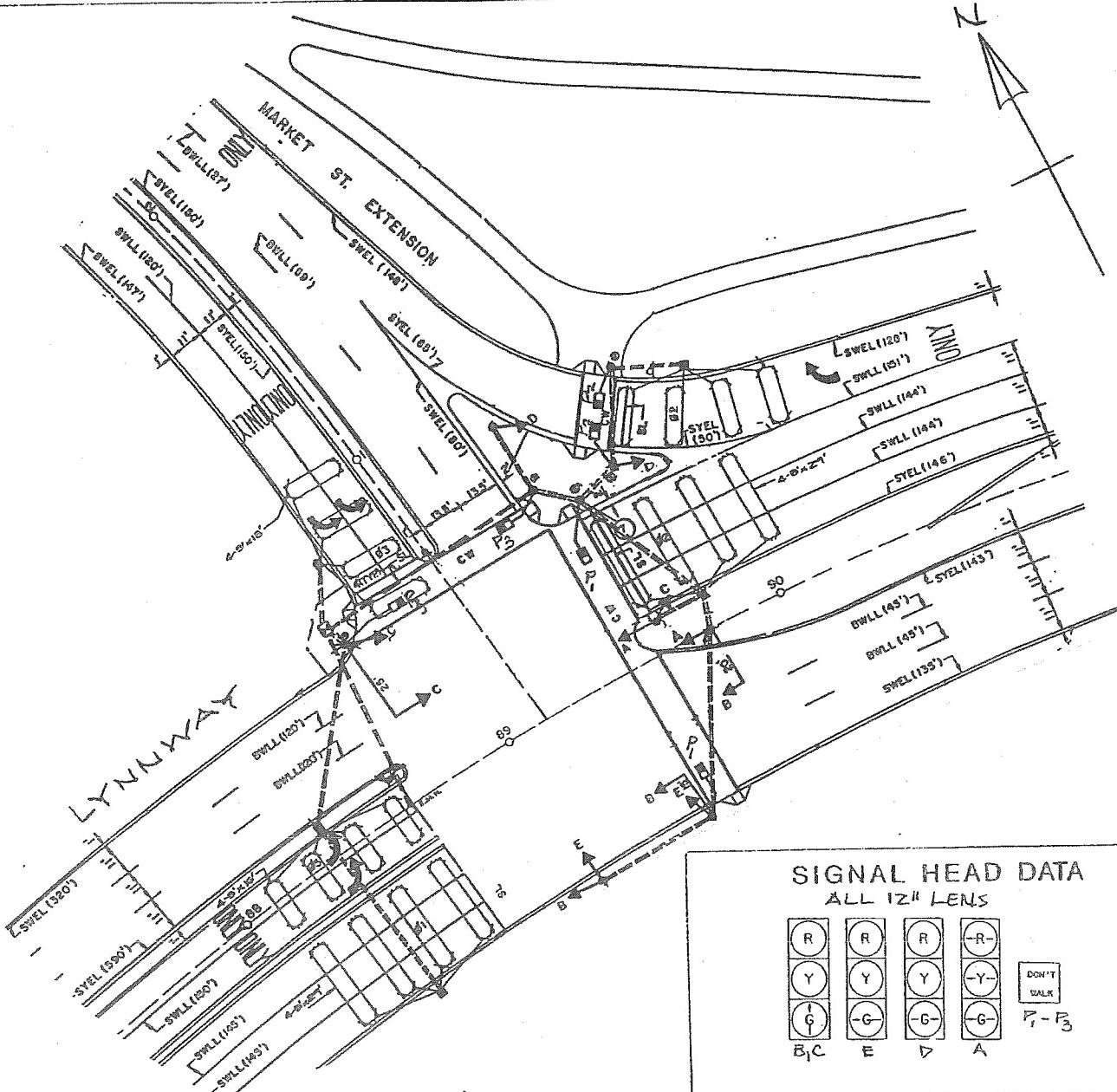
**COMMONWEALTH OF MASSACHUSETTS**

## METROPOLITAN DISTRICT COMMISSION

## **TRAFFIC SIGNAL LAYOUT**

SCALE: 1" = 50' TRAFFIC CONTROL DEVICE NO. 203

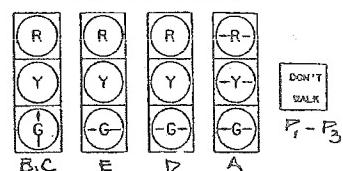
DATE: APRIL 8, 1968



## LEGEND

- |                   |       |                  |         |
|-------------------|-------|------------------|---------|
| VEHICLE SIGNAL    | →     | WOODEN POLE      | ○       |
| PEDESTRIAN SIGNAL | —■—   | SIGNAL POST      | ●       |
| CONTROL CABINET   | [ ]   | MAST ARM         | ○—      |
| LOOP DETECTOR     | [ ]   | PULL BOX         | □       |
| MAGNETIC DETECTOR | [ M ] | CONDUIT          | -----   |
| PED. PUSH BUTTON  | ⊗     | OVERHEAD CABLE   | — —     |
| TRAFFIC SIGN      | ↑     | ELECTRIC MANHOLE | ○ E.M.H |

## NOTES.



## COMMONWEALTH OF MASSACHUSETTS

## METROPOLITAN DISTRICT COMMISSION

## TRAFFIC SIGNAL SEQUENCE AND TIMING

LYNNWAY AT MARKET STREET EXTENSION - LYNN

DATE: April 4, 1988

TRAFFIC CONTROL DEVICE NO. NO. 203	SIG. NO.	1		2		3			4			5			6			7			8			FLASH	LEGEND OPER.	
		1	2	3	4	5	6	7	8	9	10	11	12	13	14	15	16	17	18	19	20	21	22	23	24	
LYNNWAY (EB)	A	RLA	RLA	RLA	RLA	RLA	RLA	RLA	GLA	(1)YLA	(2)RLA	GLA	YLA	RLA												FR (LA)
LYNNWAY (EB)	B	GVA	Y	R	R	R	R	R	R	R	R	R	R	R	R	R	R	R	R	R	R	R	R	R		FY
LYNNWAY (WB)	C	R	R	R	GVA	Y	R	R	R	R	R	R	R	R	R	R	R	R	R	R	R	R	R	R		FY
LYNNWAY (WB)	D	R	R	R	GRA	Y	R	R	R	R	R	R	R	R	R	R	R	R	R	R	R	R	R	R		FY
MARKET ST. EXT. (SB)	E	R	R	R	R	R	R	GLA	Y	R	R	R	R	R	R	R	R	R	R	R	R	R	R	R		FR
PEDESTRIAN (N-S)	P1	DW	DW	DW	DW	DW	DW	DW	DW	DW	W(1)/ FDW(1)	DW	DW	DW	DW	DW	DW	DW	DW	DW	DW	DW	DW	DW	OUT	
PEDESTRIAN (N-S)	P2	DW	DW	DW	DW	DW	DW	W(1)/ FDW(1)	DW	DW	DW	DW	DW	DW	DW	DW	DW	DW	DW	DW	DW	DW	DW	DW	OUT	
PEDESTRIAN (E-W)	P3	W(1)/ FDW(1)	DW	DW	DW	DW	DW	DW	DW	DW	DW	DW	DW	DW	DW	DW	DW	DW	DW	DW	DW	DW	DW	DW	OUT	
SECONDS PER ACTUATION																										SUPERCHANGES SEQUENCE AND TIMING DATED:
TIME BEFORE REDUCTION																										SEPTEMBER, 17, 1981
TIME TO REDUCE																										NOTES:
MINIMUM GAP																										(1) "DW" IF PED ARE NOT ACTUATED.
MINIMUM GREEN	7			7		7																				(2) If assigned right of way is to remain in effect during the next phase the signal indication for that traffic movement will not change during the clearance interval.
PASSAGE	2			2		2																				
MAXIMUM GREEN 1 (Free Operation)	70			70		40																				
MAXIMUM GREEN 2 (Coordination mode)	1			1		40																				
CLEARANCE		3	1		3	1		3	1		3	2		3	1											
WALK	7					7			7																	
PED. CLEARANCE	14					6			23																	
RECALL		OFF		OFF		OFF			OFF			OFF		OFF												
DETECTION		NON-LOCK		NON-LOCK		NON-LOCK			NON-LOCK			NON-LOCK		NON-LOCK												COORDINATION DATA SHEET ATTACHED.

## LYNNWAY AT MARKET STREET EXTENSION - LYNN

COORDINATION DATA SHEET:

	DIAL 1	DIAL 2	PLAN 3	DIAL 4
CYCLE LENGTH	120	120	90	
OFFSET	68	50	2	
YIELD POINT	54	25	33	
FORCE - OFF $\phi 3$	66	54	57	
FORCE - OFF $\phi 1 + 5$	96	96	94	
	6:00AM - 10:00AM	4:00PM - 8:00PM	10:00AM - 4:00PM	8:00PM - 6:00AM

FREE  
OPERATION

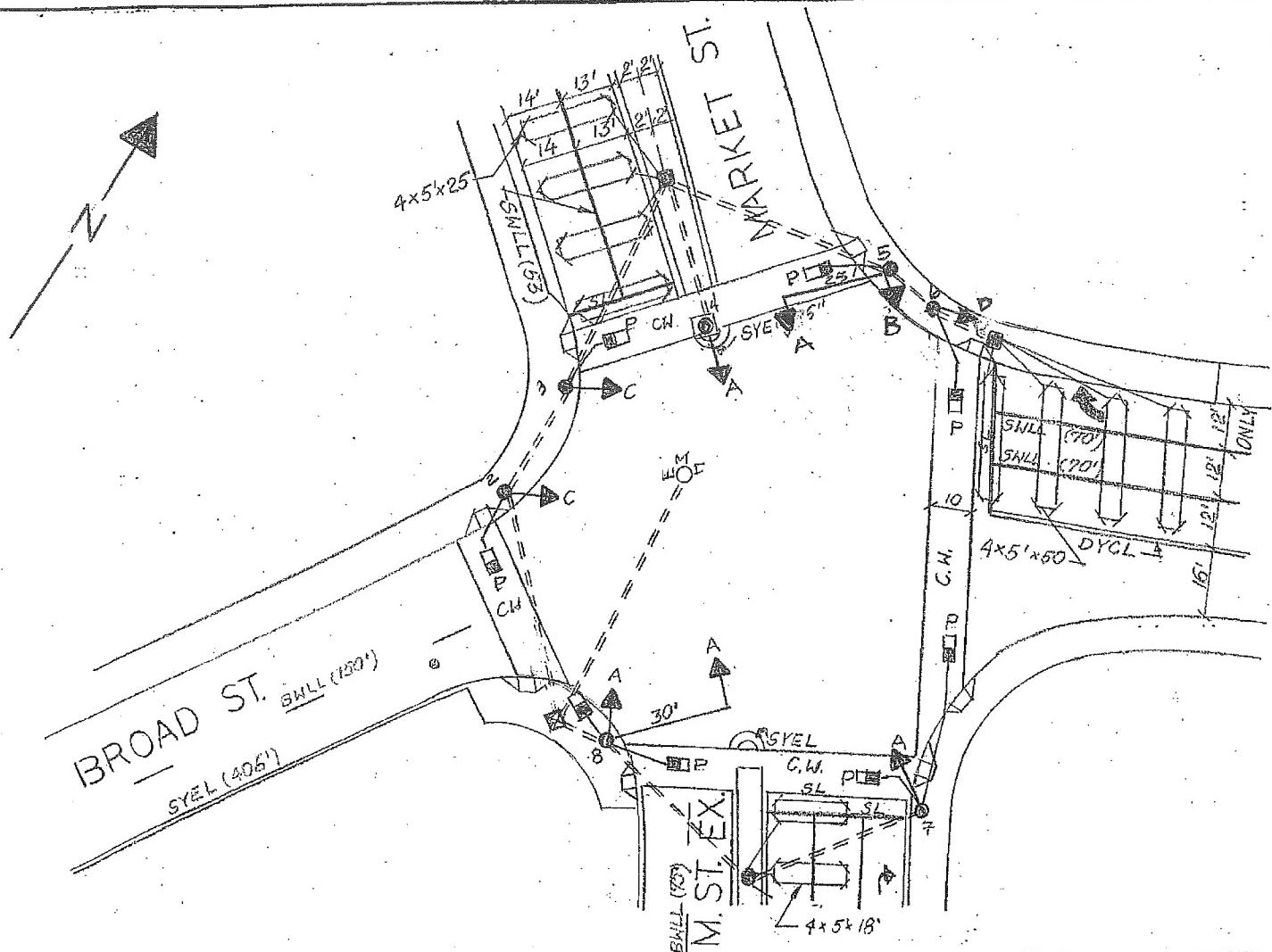
# TRAFFIC SIGNAL LAYOUT

MARKET ST. AT BROAD ST. AND MARKET ST. EXTENSION, LYNN

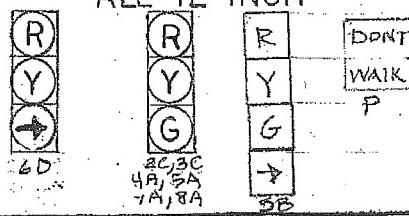
SCALE: 1"=40

TRAFFIC CONTROL DEVICE NO 237

DATE: JAN 3, 1991



### SIGNAL HEAD DATA ALL 12 INCH

**LEGEND**

VEHICLE SIGNAL	→	WOODEN POLE	○
PEDESTRIAN SIGNAL	■	SIGNAL POST	○
CONTROL CABINET	☒	MAST ARM	—
LOOP DETECTOR	□	PULL BOX	□
MAGNETIC DETECTOR	Ⓜ	CONDUIT	---
PED. PUSH BUTTON	●	OVERHEAD CABLE	---
TRAFFIC SIGN	▶	ELECTRIC MANHOLE OEMH	○

**NOTES**

# COMMONWEALTH OF MASSACHUSETTS

# METROPOLITAN DISTRICT COMMISSION

## **TRAFFIC SIGNAL SEQUENCE AND TIMING**

**MARKET STREET AT BROAD STREET AND MARKET ST. EXTENSION - LYNN**

DATE: JANUARY 3, 1991

TSD- 237

MARKET ST. EXT. , MARKET ST. AND BROAD ST - LYNN  
COORDINATION DATA SHEET

	DIAL 1	DIAL 2	DIAL 3	DIAL 4
CYCLE LENGTH(SEC)	120	120	90	FREE OPERATION
OFFSET	90	48	13	
YIELD POINT	59	65	57	
FORCE - OFF $\phi$ 2	-	-	-	
FORCE - OFF $\phi$ 3	96	95	95	
	6:00AM -	4:00PM -	10:00AM -	8:00PM - 6:00AM

NOTE:

1. TIME FOR  $\phi$ 2 SHALL BE TAKEN FROM THE LATTER PART OF  $\phi$ 1
2. OFFSETS ARE MEASURED TO BEGINNING OF  $\phi$ 1

COMMONWEALTH OF MASSACHUSETTS

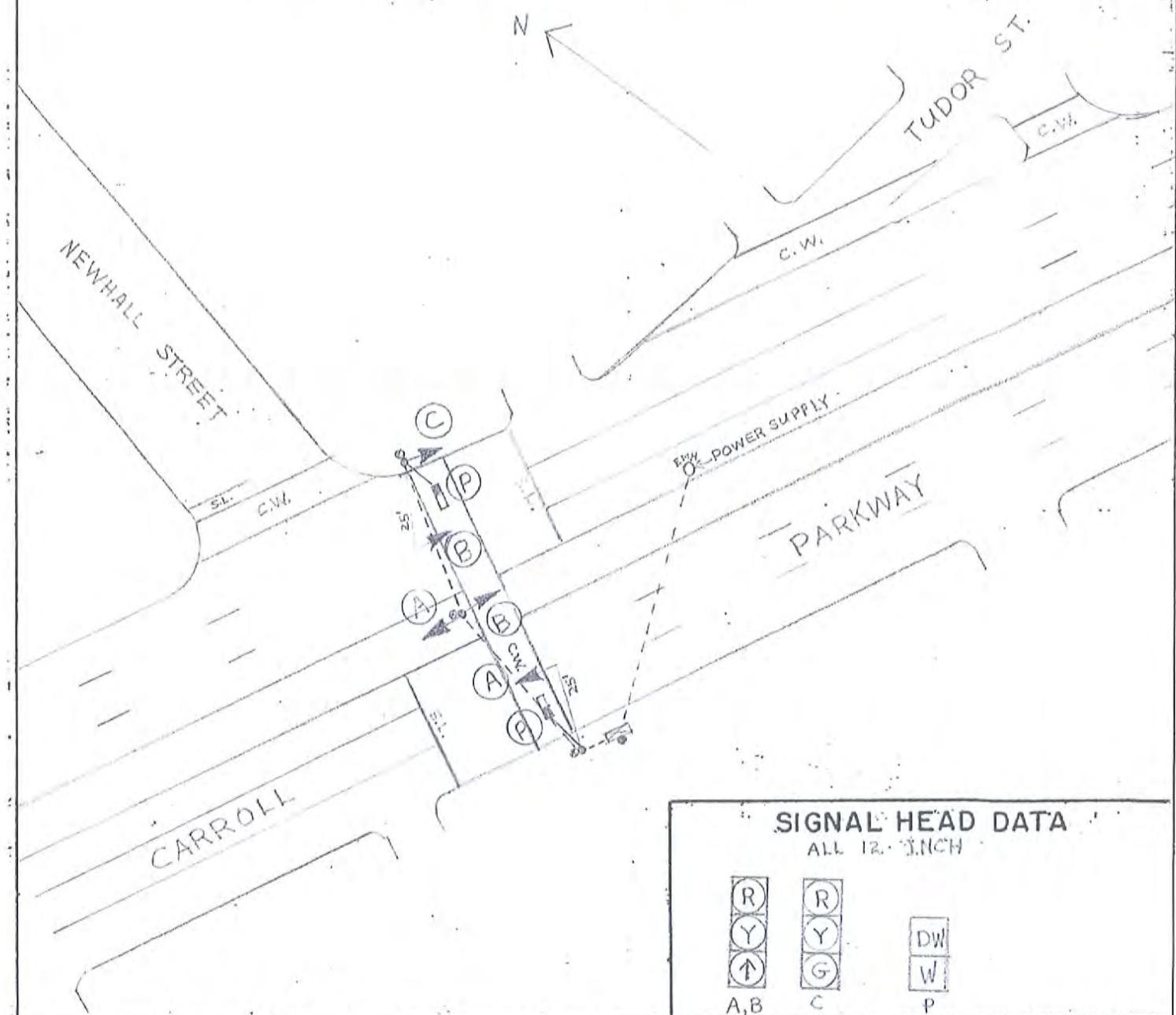
METROPOLITAN DISTRICT COMMISSION

TRAFFIC SIGNAL LAYOUT  
CARROLL PARKWAY AT NEWHALL STREET, LYNN

SCALE: 1" = 40'

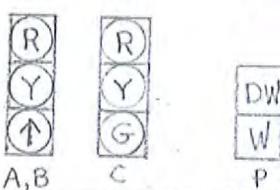
Traffic Control Device No. 225

DATE: JAN 3, 1991



SIGNAL HEAD DATA

ALL 12 INCH



LEGEND

VEHICLE SIGNAL	→	WOODEN POLE	◊
PEDESTRIAN SIGNAL	■	SIGNAL POST	●
CONTROL CABINET	☒	MAST ARM	←
LOOP DETECTOR	□	PULL BOX	□
MAGNETIC DETECTOR	Ⓜ	CONDUIT	---
PED. PUSH BUTTON	◎	OVERHEAD CABLE	—
TRAFFIC SIGN	▶	ELECTRIC MANHOLE OEMH	○

NOTES

# COMMONWEALTH OF MASSACHUSETTS

METROPOLITAN DISTRICT COMMISSION

## TRAFFIC SIGNAL SEQUENCE AND TIMING

CARROLL PARKWAY AT NEWHALL STREET, LYNN

Traffic Control Device No 225

DATE: Jan. 21, 1960

R = RED

VA = VFR:ARR

$y = \text{yellow}$

LA SALLEET 4

**G — GREEN**

BA - RIGHT

W = WALK

DW = DON'T WALK

FDW= FLASHING DON'T WA

LK

FY = FLASHING YELLOW

**NOTES :**

SUPERCEDES SEQUENCE AND TIMING DATED:  
09/23/74

Dial Change Selected by time clock

Dial 1 6:00 A.M. to 10:00 A.M.

Dial 1 6:00 A.M. to 10:00 A.M.  
Dial 2 4:00 P.M. to 8:00 P.M.

Dial 2 4:00 P.M. to 8:00 P.M.  
Dial 3 10:00 A.M. to 4:00 P.M.

trial 3 10:00 A.M. to 4:00 P.M.  
8:00 P.M. to 6:00 A.M.

8:00 P.M. to 6:00 A.M.

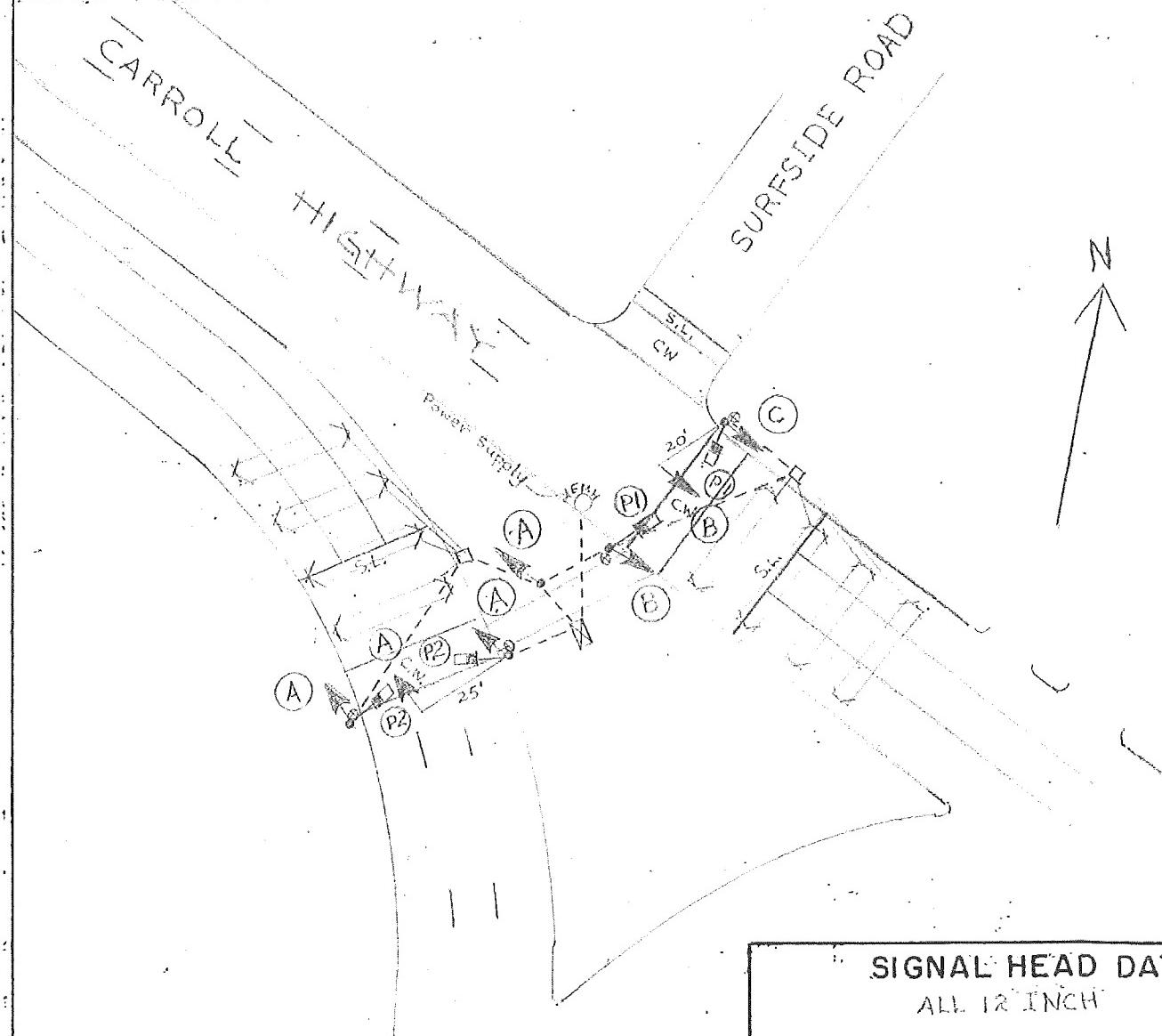
COMMONWEALTH OF MASSACHUSETTS

METROPOLITAN DISTRICT COMMISSION

TRAFFIC SIGNAL LAYOUT  
CARROLL HIGHWAY AT SURFSIDE ROAD, LYNN

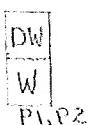
SCALE: 1" = 40' Traffic Control Device No. 226

DATE: Mar 31 1995



SIGNAL HEAD DATA

ALL 12 INCH



LEGEND

- |                   |   |                  |       |
|-------------------|---|------------------|-------|
| VEHICLE SIGNAL    | → | WOODEN POLE      | ○     |
| PEDESTRIAN SIGNAL | ■ | SIGNAL POST      | ●     |
| CONTROL CABINET   | ☒ | MAST ARM         | —     |
| LOOP DETECTOR     | □ | PULL BOX         | □     |
| MAGNETIC DETECTOR | Ⓜ | CONDUIT          | ---   |
| PED. PUSH BUTTON  | ◎ | OVERHEAD CABLE   | ---   |
| TRAFFIC SIGN      | ↑ | ELECTRIC MANHOLE | ○EMH. |

NOTES

## COMMONWEALTH OF MASSACHUSETTS

## METROPOLITAN DISTRICT COMMISSION

## TRAFFIC SIGNAL SEQUENCE AND TIMING

## CARROLL HIGHWAY AT SURFSIDE ROAD - LYNN

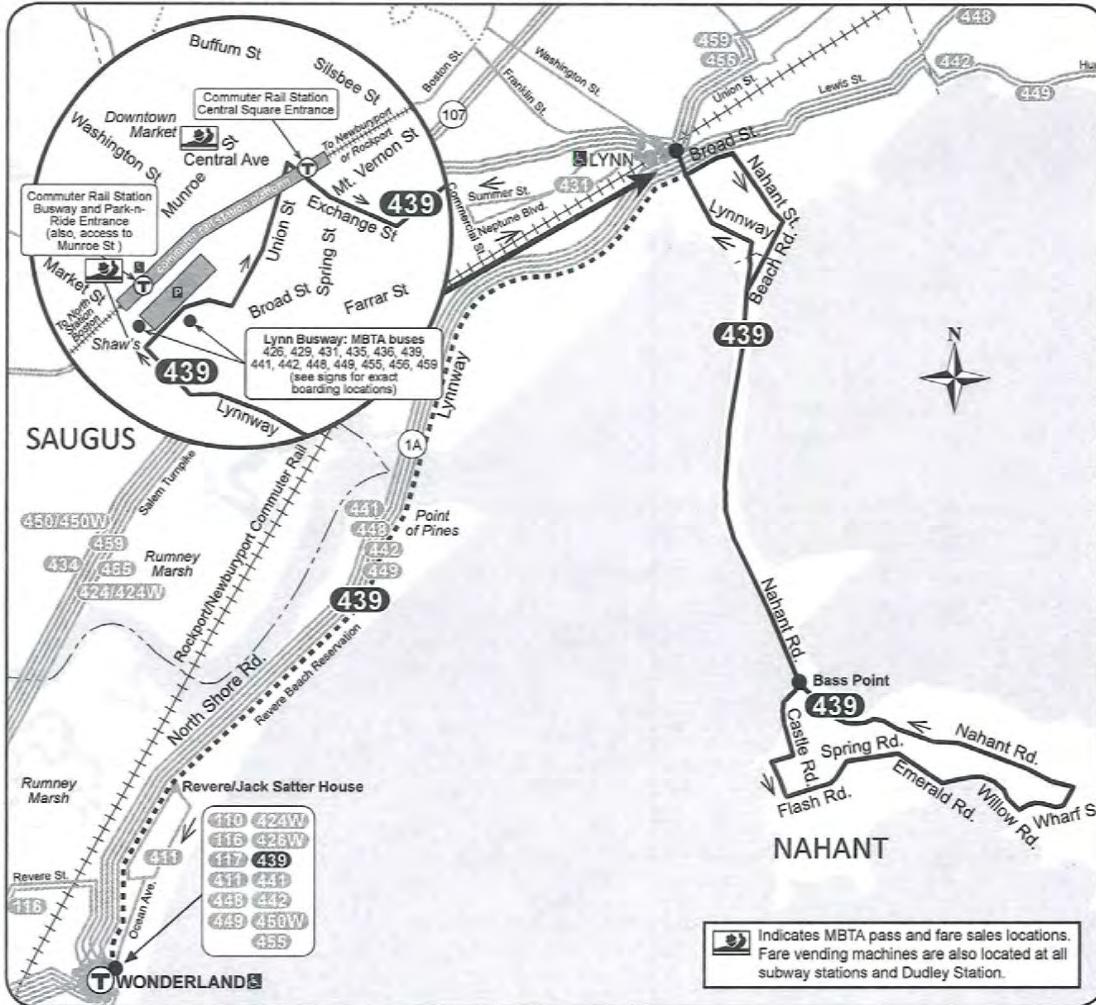
DATE: JANUARY 3, 1991

TRAFFIC CONTROL	SIG.	1		2		3			4		5			6			7		8		LEGEND	
DEVICE NO.	226	NO.	1	2	3	4	5	6	7	8	9	10	11	12	13	14	15	16	17	18	19	OPER.
CARROLL HIGHWAY E.B.	A	VA	Y*	R*	VA	Y*	R*	R	R	R												FY
CARROLL HIGHWAY W.B.	B	VA	Y*	R*	R	R	R	VA	Y*	R*												FY
CARROLL HIGHWAY W.B.	C	G	Y*	R*	R	R	R	G	Y*	R*												FY
PEDESTRIAN	P1	DW	DW	DW	W/FDW	DW	DW	DW	DW	DW												OUT
PEDESTRIAN	P2	DW	DW	DW	DW	DW	DW	W/FDW	DW	DW												OUT

# **APPENDIX D**

## **Bus Schedules**

## **Route 439 Bass Point, Nahant - Central Square, Lynn or Wonderland**



439

Fall September 5, 2015 - December 25, 2015

## **Bass Point Nahant-Central Square, Lynn or Wonderland**

## Serving

- Nahant Road
  - Wharf Street
  - Blue Line
  - Newburyport/Rockport Commuter Rail



 Massachusetts Bay  
Transportation Authority

**massDOT**  
Massachusetts Department of Transportation

Information 617-222-3200 • 1-800-392-6100  
(TTY) 617-222-5146 • [www.mbta.com](http://www.mbta.com)

**439****Weekday**

Inbound

Leave Bass Point	Arrive Central Square	Arrive Wonderland Station
6:30A a 7:30	6:45A 7:46	..... 8:07A
2:25P 6:05 6:52	2:41P 6:22 7:08	..... ..... .....

**439****Weekday**

Outbound

Leave Wonderland Station	Arrive Central Square	Arrive Bass Point
.....	6:15A v 7:10	6:29A 7:27
.....	2:08P a 5:30P a 6:17	2:20P 5:44 6:44

a - Via North Shore Road (route 1A) does not serve Point of Pines.  
 v - Via Vernon & Willow Roads

**No service on weekends**
 All buses are accessible to persons with disabilities

**Route 439**  
**Bass Point, Nahant-**  
**Central Square, Lynn or**  
**Wonderland Station**



Fare	Local Bus	Bus + Bus	Rapid Transit	Bus + Rapid Transit
CharlieCard	\$1.60	\$1.60	\$2.10	\$2.10
CharlieTicket	\$2.10	\$2.10	\$2.65	\$4.75
Cash-on-Board	\$2.10	\$4.20	\$2.65	\$4.75
Student CharlieCard*	\$0.80	\$0.80	\$1.05	\$1.05
Senior/TAP CharlieCard**	\$0.80	\$0.80	\$1.05	\$1.05

VALID PASSES: LinkPass (\$75/mo.); Monthly Local Bus (\$50/mo.); \*StudentPass (\$26.00/Month for 5-Day validity Mon-Fri or 7-Day validity on all days); \*\*Senior/TAP Pass (\$29/mo.); and express bus, commuter rail, and boat passes.

FREE FARES: Children 11 and under ride free when accompanied by an adult; Blind Access CharlieCard holders ride free and if using a guide, the guide rides free.

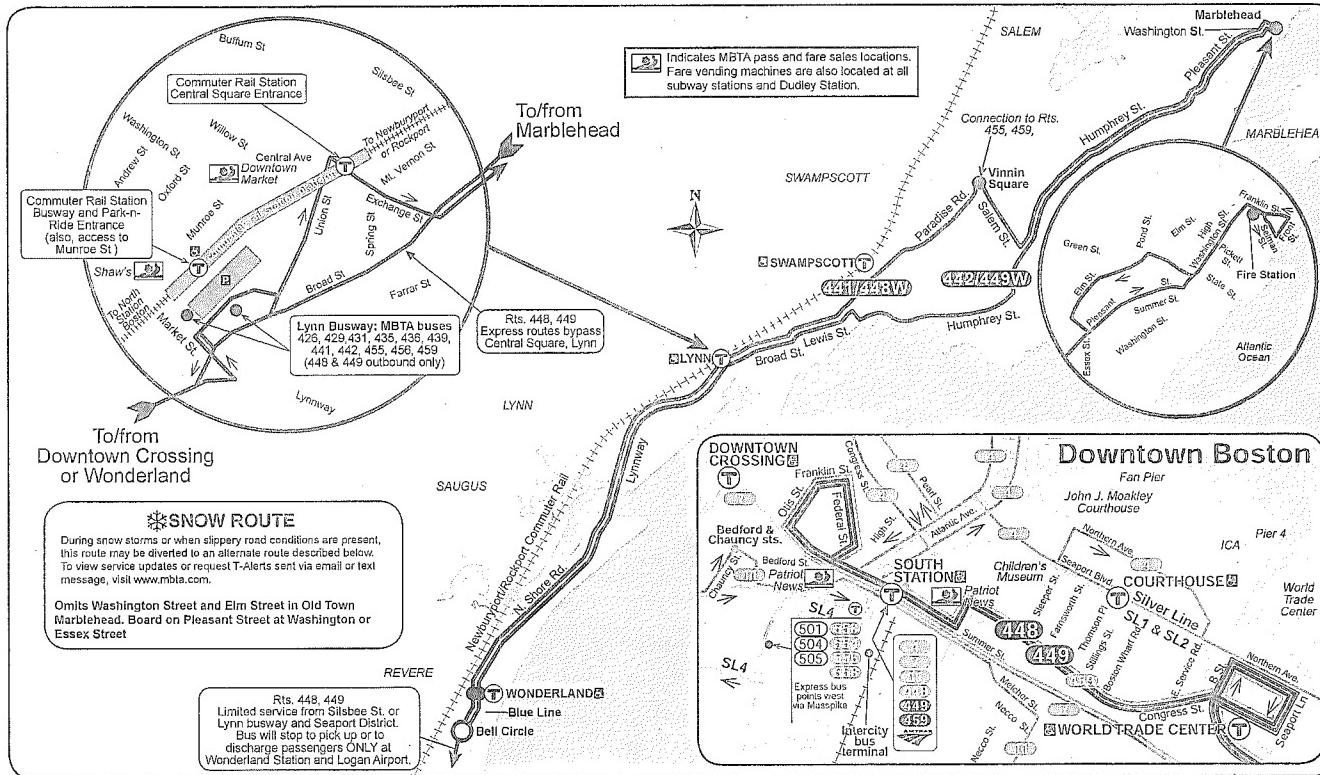
\* Requires Student CharlieCard, available to students through participating middle schools and high schools.

\*\* Requires Senior/TAP CharlieCard, available to Medicare cardholders, seniors 65+, and persons with disabilities.

**Fall 2015 Holidays**

October 12 & November 11: see Weekday  
 September 7, November 26, & December 25: see Sunday

**Route 441/442 Marblehead - Wonderland**  
**Route 448/449 Marblehead - Downtown Crossing**



schedule change

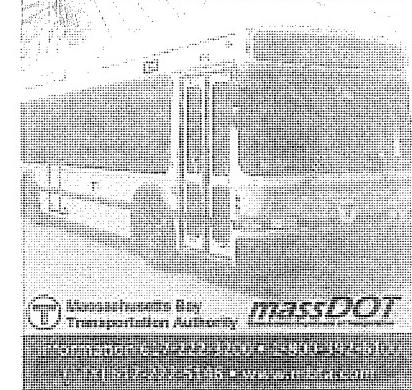
**441/442 • 448/449**

Fall September 5, 2015 - December 25, 2015

**441/442 Marblehead-Wonderland**  
**448/449 Marblehead-Downtown Crossing**

**Serving**

- Vinnin Square
- Swampscott
- Wonderland Station
- Central Square, Lynn
- Logan Airport
- Blue Line
- Green Line
- Red Line
- Orange Line
- Newburyport/Rockport Commuter Rail



441/442 & 448/449

## Weekday

Inbound									
Leave Marble- head	Lv/Arrive Phillips Beach via Paradise	Lv/Arrive Phillips Beach via Humphrey	Lv/Arrive Central Square	Arrive Wanderland Station	Arrive Logan Term. C	Arrive City & Summer Sts.	Leave City & Summer Sts.	Arrive Logan Term. C	Lv/Arrive Wanderland Station
5:40A	....	5:50A	6:05	6:21	....	....	....	....	6:00A
a 6:00	....	6:11	6:40	6:55	....	....	....	....	6:27
6:10	6:20A	6:30	6:48	7:01	....	....	....	....	6:35
a 6:28	6:40	....	7:01	7:18	7:28	7:49	....	....	6:45
6:43	6:45	....	7:01	7:21	....	....	....	....	7:30
....	6:54	7:13	7:34	....	....	....	....	....	7:35
a 6:58	....	7:00	7:16	7:35	....	....	....	....	7:40
....	7:12	....	7:42	8:03	8:19	7:15A	7:29A	....	7:47
....	7:15	....	7:35	7:58	....	....	....	....	7:50
....	....	7:30	7:46	8:05	....	....	....	....	8:06
7:13	7:26	....	7:46	8:09	....	....	7:45	7:59	8:18
a 7:28	7:41	....	....	8:21	8:37	8:58	....	....	8:33
7:43	7:45	8:05	8:28	....	....	....	....	....	8:55
a 7:58	....	7:57	8:24	8:44	....	....	....	....	9:15
....	8:12	....	8:42	9:03	9:19	....	....	....	9:40
8:13	8:15	....	8:35	8:51	....	....	....	....	10:15
....	8:30	8:30	8:47	9:05	....	....	....	....	10:45
8:13	8:26	....	8:46	9:08	....	....	....	....	11:20
....	8:45	....	9:46	9:20	....	....	....	....	11:45
8:50	....	9:04	9:31	9:51	....	....	....	....	....
9:10	9:23	....	9:44	10:01	....	....	....	....	12:15P
9:40	....	9:54	10:21	10:41	....	....	....	....	12:45
10:10	10:22	....	10:44	11:01	....	....	....	....	1:15
10:40	....	10:54	11:19	11:36	....	....	....	....	1:45
11:10	11:22	....	11:44	12:01P	....	....	....	....	2:05
11:40	....	11:52	12:14P	12:31	....	....	....	....	2:30
12:10P	12:22P	....	12:46P	1:04P	....	....	....	....	3:00
12:40	....	12:52P	1:14	1:31	....	....	....	....	3:15
1:10	1:23	....	1:47	2:06	....	....	....	....	3:30
1:40	....	1:52	2:14	2:31	....	....	....	....	3:45
2:10	2:25	....	2:49	3:08	....	....	....	....	4:00
2:40	....	2:52	3:14	3:31	....	....	....	....	4:05
....	....	....	3:41	3:56	....	....	....	....	4:10
3:10	3:23	....	3:46	4:04	....	....	....	....	4:20
3:40	....	3:52	4:10	4:29	....	....	....	....	4:35
....	....	....	4:40	4:55	....	....	....	....	4:50
4:10	4:22	....	4:45	5:01	....	....	....	....	5:05
....	....	....	5:10	5:28	....	....	....	....	5:20
4:50	....	5:05	5:25	5:42	....	8:45	5:05	....	5:26
5:20	5:35	....	5:54	6:13	....	....	....	....	5:35
5:35	....	5:47	6:09	6:25	....	....	....	....	5:50
5:50	6:03	....	6:22	6:41	....	....	a 5:15	5:35	5:52
6:05	....	6:17	6:35	6:49	....	....	....	....	6:05
w 6:34	6:44	....	7:00	....	....	....	a 5:45	6:04	6:25
6:35	....	6:47	7:02	7:16	....	....	....	....	6:35
w 7:06	7:16	....	7:32	....	....	....	a 6:15	6:33	6:51
7:15	....	7:27	7:41	7:56	....	....	....	....	7:05
w 7:30	7:41	....	7:55	....	....	....	....	....	7:15
8:15	....	8:26	8:40	8:55	....	....	....	....	7:45
9:05	....	9:26	9:40	9:55	....	....	....	....	8:15
10:15	....	10:26	10:40	10:55	....	....	....	....	9:15
11:15	....	11:26	11:40	11:55	....	....	....	....	10:15
w 12:10A	....	12:20A	12:28A	11:55	....	....	....	....	11:15

 All buses are accessible to persons with disabilities

441/442 Saturday

Saturday

Inbound			Outbound		
Leave Marble- head	Arrive Central Square	Arrive Wonderland Station	Leave Wonderland Station	Lv/Arr Central Square	Lv/Arr Central Square
p 6:30A	6:48A	7:11A	.....	wp 6:0	
h 6:55	7:13	7:35	.....	wh 6:3	
p 7:25	7:43	8:07	p 6:45	6:5	
h 7:55	8:12	8:36	h 7:15	7:2	
p 8:25	8:43	9:08	p 7:45	7:5	
h 8:55	9:13	9:39	h 8:15	8:2	
p 9:25	9:44	10:10	p 8:45	8:5	
h 10:00	10:19	10:46	h 9:15	9:2	
p 10:25	10:45	11:14	p 9:40	9:5	
h 10:55	11:14	11:41	h 10:00	10:1	
p 11:20	11:40	12:11P	p 10:25	10:3	
h 11:50	12:09P	12:36	h 10:55	11:0	
			p 11:20	11:3	
			h 11:50	12:0	
p 12:15P	12:35P	1:04P	p 12:15P	12:2	
h 12:45	1:04	1:31	h 12:45	12:5	
p 1:10	1:30	1:59	p 1:10	1:2	
h 1:40	1:59	2:26	h 1:40	1:5	
p 2:05	2:25	2:54	p 2:05	2:7	
h 2:35	2:54	3:21	h 2:35	2:4	
p 3:00	3:20	3:49	p 3:00	3:1	
h 3:30	3:49	4:16	h 3:30	3:4	
p 3:55	4:14	4:39	p 3:55	4:0	
h 4:25	4:43	5:09	h 4:25	4:3	
p 4:50	5:09	5:34	p 4:50	5:0	
h 5:20	5:37	6:01	h 5:20	5:3	
p 5:45	6:03	6:26	p 5:45	5:5	
h 6:15	6:32	6:55	h 6:15	6:2	
p 6:40	6:57	7:20	h 6:40	6:5	
h 7:10	7:26	7:49	h 7:10	7:7	
h 7:35	7:51	8:14	h 7:40	7:9	
h 8:00	8:16	8:39	h 8:35	8:4	
h 8:25	8:41	9:04	h 9:35	9:4	
h 9:25	9:41	10:03			
h 10:25	10:39	11:00			
h 11:25	11:39	12:00	h 10:40	10:5	
h 12:25A	12:39A	1:00A	h 11:45	11:5	

- a - Omits Point of Pines.
- h - Via Humphrey St.
- p - Via Paradise Rd.
- w - To or from W. Lynn & operates via Western Ave. and does not service Wonderland Station
- x - Waits for last train to arrive at station. Monday through Thursday only. Friday leaves at scheduled time.

| 441/442 Sunday

Sunday

Inbound			Outbound				
Leave Marble- head	Arrive Central Square	Arrive Wonderland Station	Leave Wonderland Station	Lv/Arrive Central Square	Arrive Marble- head		
h 7:55	8:14	8:37	.....	wh 7:30	7:54		
h 8:55	9:13	9:37	.....	wh 8:30	8:54		
p 9:25	9:45	10:07	p 8:45	9:00	9:23		
h 10:00	10:18	10:42	h 9:15	9:25	9:50		
p 10:40	11:00	11:22	p 9:45	10:00	10:23		
h 11:05	11:23	11:47	h 10:10	10:20	10:45		
p 11:35	11:55	12:22P	p 10:40	10:55	11:19		
h 12:00N	12:20P	12:44P	p 11:35	11:50	11:42		
p 12:30	12:49	1:16					
h 12:55	1:15	1:39	h 12:00N	12:11P	12:37P		
p 1:25	1:44	2:11	p 12:30	12:45	1:10		
h 1:50	2:08	2:32	h 12:55	1:06	1:32		
p 2:20	2:39	3:06	p 1:25	1:40	2:05		
h 2:45	3:03	3:27	h 1:50	2:01	2:27		
p 3:15	3:34	4:01	p 2:20	2:34	2:59		
h 3:40	3:57	4:21	h 2:45	2:56	3:22		
p 4:10	4:28	4:51	p 3:15	3:29	3:54		
h 4:35	4:52	5:16	h 3:40	3:52	4:18		
p 5:05	w 5:23	.....	p 4:10	4:24	4:47		
h 5:30	5:47	6:11	h 4:35	4:47	5:12		
p 6:00	6:18	6:41	p 5:05	5:19	5:42		
h 6:25	6:40	7:02	h 5:30	5:41	6:05		
p 6:55	7:13	7:36	p 6:00	6:14	6:37		
h 7:25	7:40	8:02	h 6:45	6:56	7:21		
h 8:25	8:40	9:02	h 7:45	7:56	8:21		
h 9:25	9:40	10:02	h 8:45	8:56	9:21		
h 10:25	10:39	11:00	h 9:45	9:55	10:18		
h 11:25	w 11:42	.....	h 10:45	10:55	11:18		
h 12:25A	12:39A	1:00A	h 11:45	11:55	12:18		
<hr/>							
Fare	Inner X-Bus Trip	Inner X-Bus + Local Bus Trip	Inner X-Bus + Subway Trip				
CharlieCard	\$3.65	\$3.65	\$3.65				
CharlieTicket	\$4.75	\$6.85	\$7.40				
Cash-on-Board	\$4.75	\$6.85	\$7.40				
Student	\$2.35	\$2.35	\$2.35				
ChariCard*	\$2.35	\$2.35	\$2.35				
Senior/TAP	\$2.35	\$2.35	\$2.35				
ChariCard**	\$2.35	\$2.35	\$2.35				
VALID FARES: Inner Express Bus (\$15/mo.) Outer Express Bus (\$168/mo.) commuter rail, and boat passes.							
FREE FARES: Children 13 and under ride free when accompanied by an adult; Blind Access CharlieCard holders ride free and if using a guide, the guide rides free.							
* Requires Student CharlieCard, available to students through participating middle schools and high schools.							
** Requires Senior/TAP CharlieCard, available to Medicare cardholders, seniors 65 and persons with disabilities.							

Shaded trips are Routes 448 & 449 and serve Logan Airport, the Seaport District and Downtown Crossing. Running time to Logan Airport is approximate due to traffic conditions. Inbound trips bypass Central Square, Lynn busway. Limited service between downtown Lynn and Seaport District, stopping ONLY at Wonderland and Logan Airport.

# NORTH SHORE TMA

Solving transportation problems  
& benefiting the environment



## Welcome Aboard the Lynn Ferry 2015!

The Lynn Ferry is a great alternative to the commuter rail and the high cost of parking. The ferry service is a partnership between the Lynn EDIC and Boston Harbor Cruises. The ferry operates seasonally on Monday – Friday beginning May 18, 2015 between Blossom Street Landing, Lynn (just off the Lynnway – Route 1A) and Long Wharf Boston. The trip between Lynn and Boston is just 30 minutes and there's plenty of FREE parking at the Blossom Street Landing!

For your convenience, Lynn Ferry tickets can be purchased at the ferry landing in Lynn or at Long Wharf in Boston.

### Lynn Ferry Fares

One way – Adult Fare: \$7.00

One way – Children (3-12) and Seniors: \$3.50

Children three years of age and under: FREE

**The Lynn Ferry accepts MBTA Zone 2 or higher commuter rail passes**

### 2015 Lynn Ferry Schedule

Monday through Friday

May 18 - September 25			
Departs	Arrives	Departs	Arrives
Blossom St. Landing Lynn 6:30 AM	Central Wharf Boston 7:05 AM	Central Wharf Boston 7:15 AM	Blossom St. Landing Lynn 7:45 AM
8:00 AM	8:35 AM	--	--
--	--	5:45 PM	6:20 PM
6:30 PM	7:05 PM	7:15 PM	7:50 PM

For more information or to view any schedule changes, please visit [www.bostonharborcruises/salem.com](http://www.bostonharborcruises/salem.com) or call 978-741-0220.

To learn more about the North Shore TMA and the Lynn Ferry services please go to: [www.NorthshoreTMA.org](http://www.NorthshoreTMA.org). Questions, contact TMA Outreach Manager Al Marrone (603-702-2156 or AlMarroneTMA@yahoo.com). Make sure to "like" us on Facebook, and follow us on Twitter for the latest ferry news and pictures.



## Lynn to Boston Ferry Schedule

**Monday through Friday Service**

May 19, 2014 through September 12, 2014

### Inbound

Depart Lynn (Blossom Street) Arrive Boston (Central Wharf)

6:30 am 7:05 am

8:00 am 8:35 am

6:30 pm 7:05 pm

### Outbound

Depart Boston (Central Wharf) Arrive Lynn (Blossom Street)

7:15 am 7:45 am

5:45 pm 6:20 pm

7:15 pm 7:50 pm

### Rates

One way: \$7.00

Children (3-12) and Seniors: \$3.50

Children under three years of age and under: FREE  
MBTA Zone 2 pass or higher



## NEWBURYPORT/ROCKPORT LINE

## Train Schedule Effective December 14, 2015

**T** Massachusetts Bay  
Transportation Authority

Keolis

Monday to Friday

Inbound to Boston

AM

SW\* - Severe weather trains

PM

ZONE	STATION	TRAIN #	100	150	152	102	154	104	156	158	106	52	160	54	108	162	110	164	112	166	114	168	116	170	56	118	172	58	94	120	174	176	122	
<b>Bikes Allowed:</b>																																		
8	Rockport	6	5:00	-	-	6:00	-	6:44	-	-	7:22	-	-	9:10	-	10:05	-	12:00	-	2:00	-	3:55	-	-	5:25	-	-	6:55	7:45	-	-	10:45		
7	Gloucester	6	5:07	-	-	6:07	-	6:52	-	-	7:30	-	-	9:18	-	10:13	-	12:08	-	2:08	-	4:02	-	-	5:33	-	-	7:03	7:53	-	-	11:52		
7	West Gloucester	6	<b>f 5:14</b>	-	-	6:14	-	6:58	-	-	7:36	-	-	<b>f 9:23</b>	-	<b>f 10:19</b>	-	<b>f 12:14</b>	-	<b>f 2:14</b>	-	<b>f 4:08</b>	-	<b>f 5:38</b>	-	-	<b>f 7:14</b>	<b>8:05</b>	-	-	<b>f 10:58</b>			
6	Manchester	6	5:20	-	-	6:20	-	7:04	-	-	7:42	-	-	9:30	-	10:25	-	12:20	-	2:20	-	4:14	-	-	5:44	-	-	<b>f 7:14</b>	<b>8:05</b>	-	-	<b>f 11:04</b>		
5	Beverly Farms	6	5:26	-	-	6:26	-	7:10	-	-	7:49	-	-	9:36	-	10:31	-	12:26	-	2:26	-	<b>f 4:21</b>	-	<b>f 5:51</b>	-	-	<b>f 8:11</b>	-	-	-	<b>f 11:11</b>			
5	Prides Crossing	-	-	-	<b>f 6:29</b>	-	7:13	-	-	7:51	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-			
4	Montserrat	6	5:31	-	-	6:33	-	7:17	-	-	7:56	-	-	9:41	-	<b>f 10:36</b>	-	<b>f 12:31</b>	-	<b>f 2:31</b>	-	<b>f 4:26</b>	-	<b>f 5:56</b>	-	-	<b>f 8:16</b>	-	-	<b>f 11:15</b>				
8	Newburyport	6	-	5:22	5:50	-	6:30	-	7:00	-	-	-	-	<b>7:55</b>	-	-	9:30	-	11:06	-	1:06	-	2:45	-	4:35	-	-	-	-	9:00	10:35	-	-	-
7	Rowley	6	-	5:29	5:57	-	6:37	-	7:07	-	-	-	-	8:02	-	-	9:37	-	11:13	-	1:13	-	2:52	-	4:42	-	-	<b>f 5:52</b>	-	-	<b>f 9:06</b>	-	-	-
6	Ipswich	6	-	5:35	6:03	-	6:42	-	7:13	-	-	-	-	8:07	-	-	9:42	-	11:18	-	1:18	-	2:58	-	4:48	-	-	5:57	-	-	9:12	-	-	-
5	Hamilton/Wenham	6	-	5:41	6:09	-	6:49	-	7:20	7:37	-	-	-	8:14	-	-	9:49	-	11:25	-	1:25	-	3:04	-	4:55	-	-	6:12	-	-	<b>f 9:19</b>	-	-	-
5	North Beverly	6	-	5:45	6:13	-	6:53	-	7:24	7:41	-	-	-	8:18	-	<b>f 9:53</b>	-	<b>f 11:29</b>	-	<b>f 2:29</b>	-	<b>f 3:08</b>	-	<b>f 4:59</b>	-	<b>f 5:16</b>	-	-	<b>f 9:23</b>	-	-	-		
4	Beverly	6	5:36	5:50	6:18	6:38	6:58	7:23	7:30	7:45	8:01	8:14	8:23	9:20	9:46	9:58	10:41	11:35	12:36	1:34	2:36	3:13	4:30	5:04	5:40	6:01	6:21	7:00	<b>f 7:27</b>	8:21	9:28	10:56	11:21	
3	Salem	6	5:40	5:54	6:22	6:43	7:03	7:28	7:35	7:50	8:07	8:18	8:27	9:24	9:51	10:02	10:45	11:40	12:41	1:38	2:40	3:17	4:35	5:08	-	6:05	6:30	7:04	7:31	8:25	9:32	10:00	11:25	
3	Swampscott	6	5:47	6:01	6:29	6:49	7:10	-	7:41	7:57	-	8:25	8:34	9:31	9:57	10:09	10:52	11:47	12:47	1:45	2:47	3:24	4:41	5:14	-	<b>f 6:12</b>	-	<b>f 7:10</b>	-	<b>f 8:31</b>	<b>f 9:38</b>	-	<b>f 11:32</b>	
2	Lynn	6	5:50	6:04	6:32	6:53	7:13	-	7:45	8:00	-	8:28	8:37	9:34	10:00	10:12	10:55	11:50	12:50	1:48	2:50	3:27	<b>f 4:45</b>	5:18	-	<b>f 6:15</b>	-	<b>f 7:14</b>	<b>f 8:34</b>	<b>f 9:41</b>	-	<b>f 11:35</b>		
2	River Works	6	<b>f 5:53</b>	<b>f 6:07</b>	<b>f 6:35</b>	<b>f 6:56</b>	<b>f 7:16</b>	-	-	-	<b>f 8:03</b>	-	<b>f 8:40</b>	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	<b>f 9:44</b>	-	<b>f 11:37</b>	
1A	Chelsea	6	<b>f 6:01</b>	<b>f 6:44</b>	7:04	7:24	-	7:54	8:11	-	8:37	8:48	<b>f 9:43</b>	<b>f 10:10</b>	<b>f 10:21</b>	<b>f 11:05</b>	<b>f 11:59</b>	<b>f 1:00</b>	<b>f 1:57</b>	<b>f 3:02</b>	<b>f 3:37</b>	<b>f 4:56</b>	<b>f 5:28</b>	-	<b>f 6:27</b>	<b>f 6:49</b>	<b>f 7:22</b>	<b>f 8:44</b>	<b>f 9:51</b>	-	<b>f 11:44</b>			
1A	North Station	6	6:15	6:27	6:56	7:18	7:38	7:55	8:10	8:25	8:33	8:50	9:01	9:55	10:22	10:33	11:17	12:11	1:12	2:09	3:14	3:49	5:10	5:41	6:15	6:39	7:02	7:34	-	8:56	10:03	11:27	11:56	

Monday to Friday

Outbound from Boston

AM

PM

AM

ZONE	STATION	TRAIN #	151	153	51	101	155	53	103	157	105	159	107	161	109	163	111	165	55	113	167	115	169	57	117	171	95	173	119	175	121	177	123	
<b>Bikes Allowed:</b>																																		
1A	North Station	6	6:30	6:42	7:10	7:40	8:10	8:25	9:35	9:40	10:20	11:20	12:20	12:20	12:20	2:20	3:20	4:00	4:20	4:45	5:00	5:15	5:30	5:40	5:55	6:15	6:45	-	7:40	8:30	9:20	10:40	11:45	12:10
1A	Chelsea	6	<b>f 6:52</b>	<b>f 7:20</b>	7:51	<b>f 8:20</b>	-	<b>f 8:48</b>	<b>f 9:51</b>	<b>f 10:31</b>	-	11:31	12:31	13:1	<b>f 2:31</b>	<b>f 3:31</b>	<b>f 4:20</b>	<b>f 4:29</b>	4:43	5:06	5:36	5:51	6:06	6:26	6:56	-	<b>f 8:41</b>	9:31	<b>f 10:51</b>	<b>f 11:56</b>	<b>f 12:21</b>			
2	River Works	6	<b>f 7:00</b>	<b>f 7:28</b>	7:51	<b>f 8:20</b>	-	<b>f 8:48</b>	<b>f 9:51</b>	<b>f 10:31</b>	-	11:31	12:31	13:1	<b>f 2:31</b>	<b>f 3:31</b>	<b>f 4:20</b>	<b>f 4:29</b>	4:43	5:06	5:36	5:51	6:06	6:26	6:56	-	<b>f 8:41</b>	9:31	<b>f 10:51</b>	<b>f 11:56</b>	<b>f 12:21</b>			
2	Lynn	6	-	-	7:33	8:03	<b>f 8:31</b>	-	8:59	10:00	10:42	11:41	12:41	14:1	14:1	14:1	14:43	14:43	14:43	14:43	14:43	14:43	14:43	14:43	14:43	14:43	14:43	14:43	14:43	14:43	14:43	14:43	14:43	
3	Swampscott	6	-	-	7:36	<b>f 8:06</b>	<b>f 8:33</b>	-	9:02	10:04	10:45	11:44	12:44	14:4	14:4	14:4	14:46	14:46	14:46	14:46	14:46	14:46	14:46	14:46	14:46	14:46	14:46	14:46	14:46	14:46	14:46	14:46	14:46	
3	Salem	6	6:54	<b>f 7:10</b>	7:42	8:12	8:41	8:56	9:08	10:11	10:51	11:51	12:51	15:1	15:1	15:1	15:3	15:3	15:3	15:3	15:3	15:3	15:3	15:3	15:3	15:3	15:3	15:3	15:3	15:3	15:3	15:3		
4	Beverly Farms	6	<b>f 7:14</b>	7:47	8:16	8:45	9:00	9:12	10:15	10:55	11:55	12:55	13:5	13:5	13:5	13:5	13:5	13:5	13:5	13:5	13:5	13:5	13:5	13:5	13:5	13:5	13:5	13:5	13:5	13:5	13:5			
4	Montserrat	6	<b>f 7:31</b>	-	<b>f 10:31</b>	-	<b>f 12:31</b>	-	<b>f 1:31</b>	-	<b>f 8:01</b>	-	<b>f 10:30</b>	-	<b>f 5:42</b>	-	<b>f 5:57</b>	-	<b>f 6:23</b>	-	<b>f 7:28</b>	-	<b>f 8:08</b>	-	11:21	-	<b>f 12:48</b>							
5	Newburyport	6	-	-	8:52	-	10:52	-	12:52	-	2:52	-	5:52	-	9:00	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-		
7	Rowley	6	-	8:58	-	10:58	-	12:58	-	2:58	-	5:58	-	9:05	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-		
6	Ipswich	6	-	9:05	-	11:05	-	10:5	-	3:05	-	6:05	-	9:13	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-		
5	Hamilton/Wenham	6	-	9:11	-	11:11	-	1:11	-	3:11	-	6:11	-	9:19	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-		
5	North Beverly	6	-	<b>f 9:15</b>	-	<b>f 11:15</b>	-	<b>f 1:15</b>	-	<b>f 3:15</b>	-	<b>f 16:15</b>	-	<b>f 9:23</b>	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-		
4	Beverly	6	7:36	9:20	10:36	11:20	12:36	12:0	2:36	3:20	5:46	6:20	8:06	9:28	10:35	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-		
3	Salem	6	7:40	9:24	10:40	11:24</																												

# **APPENDIX E**

## **Traffic Safety Data**



## Lynnway Crashes (2010 to 2012)

Count	Crash Number	Crash Year	Crash Time	Crash Date2	Crash_Severity	Manner of Collision	Road Surface	Ambient Light	Weather Condition	Non Motorized Collision	Bicycle or Pedestrian Involved
1	2575161	2010	5:59 PM	18-Jan-2010	Non-fatal injury	Rear-end	Snow	Dark - lighted roadway	Cloudy/Snow		
2	2578866	2010	6:13 AM	11-Feb-2010	Property damage only (no injuries)	Rear-end	Wet	Dawn	Clear/Snow		
3	2569742	2010	2:19 PM	04-Jan-2010	Property damage only (no injuries)	Angle	Wet	Daylight	Cloudy		
4	2554563	2010	9:30 AM	13-Jan-2010	Property damage only (no injuries)	Rear-end	Dry	Daylight	Clear		
5	2590577	2010	7:28 PM	10-Apr-2010	Property damage only (no injuries)	Single vehicle crash	Dry	Dusk	Not Reported		
6	2578970	2010	12:40 PM	22-Mar-2010	Non-fatal injury	Head-on	Dry	Daylight	Cloudy		
7	2577953	2010	8:43 PM	15-Mar-2010	Property damage only (no injuries)	Angle	Wet	Dark - lighted roadway	Rain		
8	2577195	2010	10:45 PM	16-Mar-2010	Property damage only (no injuries)	Sideswipe, same direction	Dry	Dark - lighted roadway	Clear		
9	2577173	2010	3:21 PM	29-Jan-2010	Property damage only (no injuries)	Rear-to-rear	Other	Daylight	Clear/Clear		
10	2578821	2010	11:12 AM	09-Feb-2010	Property damage only (no injuries)	Angle	Dry	Daylight	Clear		
11	2579796	2010	1:33 PM	23-Mar-2010	Non-fatal injury	Angle	Wet	Daylight	Cloudy		
12	2577960	2010	12:30 PM	20-Mar-2010	Property damage only (no injuries)	Angle	Dry	Daylight	Not Reported		
13	2577961	2010	2:00 PM	20-Mar-2010	Property damage only (no injuries)	Rear-end	Dry	Daylight	Not Reported		
14	2592251	2010	4:40 PM	09-Apr-2010	Property damage only (no injuries)	Sideswipe, same direction	Wet	Daylight	Not Reported		
15	2586788	2010	3:30 PM	28-Mar-2010	Property damage only (no injuries)	Angle	Dry	Daylight	Clear		
16	2590566	2010	10:20 AM	02-Apr-2010	Property damage only (no injuries)	Angle	Dry	Daylight	Not Reported	P2:Pedalcyclist (bicyc	
17	2625622	2010	5:08 PM	01-Aug-2010	Property damage only (no injuries)	Angle	Dry	Daylight	Clear		
18	2625701	2010	5:49 PM	01-Aug-2010	Property damage only (no injuries)	Angle	Dry	Daylight	Clear		
19	2592258	2010	6:45 AM	19-Apr-2010	Non-fatal injury	Sideswipe, same direction	Dry	Daylight	Clear		
20	2595737	2010	12:50 PM	01-May-2010	Non-fatal injury	Rear-end	Dry	Daylight	Clear		
21	2595348	2010	12:55 PM	04-May-2010	Property damage only (no injuries)	Sideswipe, same direction	Dry	Daylight	Clear		
22	2597879	2010	6:40 AM	11-May-2010	Property damage only (no injuries)	Rear-end	Dry	Daylight	Not Reported		
23	2598907	2010	4:35 PM	14-May-2010	Non-fatal injury	Not reported	Not reported	Not reported	Not Reported		
24	2599300	2010	10:58 AM	19-May-2010	Property damage only (no injuries)	Angle	Wet	Daylight	Rain/Rain		
25	2629604	2010	3:25 PM	08-Aug-2010	Non-fatal injury	Rear-end	Dry	Daylight	Cloudy		
26	2600183	2010	2:05 PM	19-May-2010	Property damage only (no injuries)	Rear-end	Wet	Daylight	Not Reported		
27	2599760	2010	2:50 PM	19-May-2010	Property damage only (no injuries)	Rear-end	Wet	Daylight	Not Reported		
28	2601448	2010	7:20 AM	24-May-2010	Property damage only (no injuries)	Rear-end	Dry	Daylight	Not Reported		
29	2757099	2010	1:00 PM	24-May-2010	Not Reported	Not reported	Dry	Not reported	Clear		
30	2603998	2010	4:21 PM	25-May-2010	Property damage only (no injuries)	Angle	Dry	Daylight	Clear/Clear		
31	2750484	2010	12:10 PM	26-May-2010	Property damage only (no injuries)	Sideswipe, same direction	Dry	Daylight	Clear		
32	2607139	2010	1:52 PM	29-May-2010	Property damage only (no injuries)	Rear-end	Dry	Daylight	Clear		
33	2610582	2010	1:10 PM	12-Jun-2010	Non-fatal injury	Rear-end	Dry	Daylight	Clear		
34	2623109	2010	7:43 PM	18-Jun-2010	Property damage only (no injuries)	Angle	Dry	Daylight	Clear		
35	2613172	2010	3:24 PM	20-Jun-2010	Not Reported	Angle	Dry	Daylight	Not Reported		ped
36	2620589	2010	1:00 PM	23-Jun-2010	Property damage only (no injuries)	Angle	Dry	Daylight	Not Reported		
37	2617582	2010	11:15 AM	05-Jul-2010	Not Reported	Rear-end	Dry	Daylight	Clear		
38	2617583	2010	12:16 PM	05-Jul-2010	Not Reported	Rear-end	Dry	Daylight	Clear		
39	2622069	2010	2:40 AM	14-Jul-2010	Not Reported	Sideswipe, same direction	Dry	Dark - lighted roadway	Clear		
40	2624970	2010	5:55 PM	21-Jul-2010	Property damage only (no injuries)	Angle	Dry	Daylight	Clear		
41	2621605	2010	8:24 AM	24-Jul-2010	Property damage only (no injuries)	Rear-end	Dry	Daylight	Clear		
42	2622722	2010	7:21 AM	26-Jul-2010	Non-fatal injury	Single vehicle crash	Dry	Daylight	Clear	P2:Pedalcyclist (bicyc	
43	2622975	2010	8:58 AM	27-Jul-2010	Non-fatal injury	Single vehicle crash	Dry	Daylight	Clear	P2:Pedalcyclist (bicyc	
44	2630861	2010	9:32 AM	28-Jul-2010	Property damage only (no injuries)	Rear-end	Dry	Daylight	Clear		

## Lynnway Crashes (2010 to 2012)

Count	Crash Number	Crash Year	Crash Time	Crash Date2	Crash_Severity	Manner of Collision	Road Surface	Ambient Light	Weather Condition	Non Motorized Collision	Bicycle or Pedestrian Involved
45	2626781	2010	4:31 PM	30-Jul-2010	Fatal injury	Rear-end	Dry	Daylight	Clear		
46	2628181	2010	4:20 PM	06-Aug-2010	Property damage only (no injuries)	Angle	Dry	Daylight	Clear		
47	2627149	2010	8:14 PM	06-Aug-2010	Property damage only (no injuries)	Angle	Dry	Daylight	Clear		
48	2631327	2010	12:37 PM	20-Aug-2010	Property damage only (no injuries)	Sideswipe, same direction	Dry	Daylight	Clear		
49	2633028	2010	1:27 PM	22-Aug-2010	Property damage only (no injuries)	Rear-end	Wet	Daylight	Rain		
50	2633026	2010	6:42 AM	23-Aug-2010	Property damage only (no injuries)	Sideswipe, same direction	Wet	Daylight	Cloudy/Rain		
51	2632037	2010	7:38 AM	24-Aug-2010	Property damage only (no injuries)	Rear-end	Dry	Daylight	Not Reported		
52	2634265	2010	9:08 PM	25-Aug-2010	Property damage only (no injuries)	Single vehicle crash	Wet	Dark - lighted roadway	Rain		
53	2643257	2010	10:20 PM	26-Aug-2010	Property damage only (no injuries)	Angle	Dry	Dark - lighted roadway	Clear		
54	2663639	2010	9:15 AM	10-Nov-2010	Property damage only (no injuries)	Rear-end	Dry	Daylight	Clear		
55	2667084	2010	3:30 PM	11-Nov-2010	Property damage only (no injuries)	Angle	Dry	Daylight	Clear		
56	2921189	2010	6:00 AM	26-Sep-2010	Property damage only (no injuries)	Single vehicle crash	Dry	Dawn	Clear		
57	2648715	2010	11:07 AM	01-Oct-2010	Property damage only (no injuries)	Rear-end	Dry	Daylight	Clear		
58	2647241	2010	1:15 PM	01-Oct-2010	Property damage only (no injuries)	Rear-end	Wet	Daylight	Rain		
59	2647165	2010	11:20 AM	02-Oct-2010	Non-fatal injury	Rear-end	Dry	Daylight	Clear		
60	2650100	2010	6:33 AM	12-Oct-2010	Property damage only (no injuries)	Rear-end	Wet	Dark - lighted roadway	Cloudy		
61	2651087	2010	7:29 PM	14-Oct-2010	Non-fatal injury	Rear-end	Dry	Dark - lighted roadway	Cloudy/Cloudy		
62	2653159	2010	9:50 AM	15-Oct-2010	Property damage only (no injuries)	Rear-end	Dry	Daylight	Cloudy		
63	2653051	2010	00:00 AM	19-Oct-2010	Property damage only (no injuries)	Rear-end	Dry	Dark - lighted roadway	Clear		
64	2654018	2010	6:57 AM	26-Oct-2010	Property damage only (no injuries)	Rear-end	Wet	Daylight	Clear		
65	2658383	2010	2:15 PM	29-Oct-2010	Non-fatal injury	Rear-end	Dry	Daylight	Not Reported		
66	2656727	2010	3:20 PM	02-Nov-2010	Property damage only (no injuries)	Rear-end	Dry	Daylight	Clear		
67	2657774	2010	2:45 PM	04-Nov-2010	Property damage only (no injuries)	Rear-end	Wet	Daylight	Rain		
68	2663637	2010	12:20 PM	05-Nov-2010	Property damage only (no injuries)	Angle	Dry	Daylight	Clear		
69	2663811	2010	3:20 PM	05-Nov-2010	Property damage only (no injuries)	Single vehicle crash	Dry	Daylight	Not Reported		
70	2657966	2010	5:47 PM	07-Nov-2010	Non-fatal injury	Rear-end	Dry	Dark - lighted roadway	Not Reported		
71	2659895	2010	7:43 AM	09-Nov-2010	Property damage only (no injuries)	Sideswipe, same direction	Dry	Daylight	Clear		
72	2662323	2010	10:40 AM	16-Nov-2010	Property damage only (no injuries)	Angle	Dry	Daylight	Clear		
73	2666153	2010	10:35 PM	19-Nov-2010	Non-fatal injury	Single vehicle crash	Dry	Dark - lighted roadway	Not Reported		
74	2663641	2010	8:50 AM	20-Nov-2010	Non-fatal injury	Angle	Dry	Daylight	Not Reported		
75	2665452	2010	5:57 AM	26-Nov-2010	Non-fatal injury	Rear-end	Water (standing, flowing)	Dark - lighted roadway	Sleet, hail (freezing rain or drizzle)		
76	2664787	2010	9:02 PM	28-Nov-2010	Non-fatal injury	Single vehicle crash	Dry	Dark - lighted roadway	Clear		
77	2667901	2010	7:25 PM	29-Nov-2010	Non-fatal injury	Single vehicle crash	Dry	Dark - lighted roadway	Not Reported		
78	2668610	2010	9:55 AM	01-Dec-2010	Property damage only (no injuries)	Angle	Wet	Daylight	Cloudy		
79	2669444	2010	3:44 PM	08-Dec-2010	Property damage only (no injuries)	Rear-end	Dry	Daylight	Clear		
80	2669912	2010	1:51 PM	09-Dec-2010	Non-fatal injury	Rear-end	Dry	Daylight	Not Reported		
81	2671213	2010	00:00 AM	13-Dec-2010	Not Reported	Single vehicle crash	Wet	Dark - lighted roadway	Cloudy/Rain		
82	2675113	2010	10:15 PM	18-Dec-2010	Property damage only (no injuries)	Sideswipe, same direction	Dry	Dark - lighted roadway	Clear		
83	2675182	2010	8:42 AM	23-Dec-2010	Property damage only (no injuries)	Angle	Wet	Daylight	Cloudy/Other		
84	2676736	2010	1:45 PM	28-Dec-2010	Non-fatal injury	Angle	Wet	Daylight	Not Reported		
85	2686794	2011	2:25 PM	05-Jan-2011	Property damage only (no injuries)	Angle	Dry	Daylight	Cloudy		
86	2678147	2011	11:12 AM	06-Jan-2011	Property damage only (no injuries)	Rear-end	Dry	Daylight	Clear		
87	2690159	2011	11:23 AM	11-Jan-2011	Property damage only (no injuries)	Angle	Wet	Daylight	Not Reported		
88	2685939	2011	4:10 PM	11-Jan-2011	Property damage only (no injuries)	Sideswipe, same direction	Dry	Dusk	Clear		

## Lynnway Crashes (2010 to 2012)

Count	Crash Number	Crash Year	Crash Time	Crash Date2	Crash_Severity	Manner of Collision	Road Surface	Ambient Light	Weather Condition	Non Motorized Collision	Bicycle or Pedestrian Involved
89	2680257	2011	2:41 PM	12-Jan-2011	Non-fatal injury	Single vehicle crash	Snow	Daylight	Cloudy/Snow		
90	2692059	2011	9:48 AM	14-Jan-2011	Property damage only (no injuries)	Rear-end	Slush	Daylight	Cloudy		
91	2680658	2011	9:03 AM	16-Jan-2011	Non-fatal injury	Angle	Dry	Daylight	Clear		
92	2696494	2011	11:06 AM	18-Jan-2011	Property damage only (no injuries)	Angle	Snow	Daylight	Snow/Snow		
93	2690357	2011	11:00 AM	22-Jan-2011	Non-fatal injury	Angle	Wet	Daylight	Snow		
94	2693757	2011	11:25 AM	24-Jan-2011	Property damage only (no injuries)	Angle	Dry	Daylight	Clear/Clear		
95	2690161	2011	9:30 AM	26-Jan-2011	Property damage only (no injuries)	Angle	Dry	Daylight	Not Reported		
96	2689458	2011	12:49 PM	04-Feb-2011	Property damage only (no injuries)	Angle	Dry	Daylight	Clear		
97	2689459	2011	7:20 AM	05-Feb-2011	Non-fatal injury	Single vehicle crash	Ice	Daylight	Clear	P2:Pedestrian	ped
98	2700900	2011	2:22 PM	14-Feb-2011	Property damage only (no injuries)	Angle	Dry	Daylight	Clear		
99	2701727	2011	10:10 AM	20-Feb-2011	Not Reported	Rear-end	Dry	Daylight	Clear		
100	2705773	2011	1:00 PM	22-Feb-2011	Non-fatal injury	Rear-end	Dry	Daylight	Clear		
101	2701729	2011	7:10 AM	28-Feb-2011	Non-fatal injury	Sideswipe, same direction	Wet	Daylight	Rain/Sleet, hail (freezing rain or drizzle)		
102	2722124	2011	3:44 PM	22-Apr-2011	Property damage only (no injuries)	Not reported	Not reported	Not reported	Not Reported		
103	2725510	2011	10:59 PM	16-May-2011	Property damage only (no injuries)	Sideswipe, same direction	Dry	Daylight	Cloudy		
104	2726956	2011	2:20 PM	20-May-2011	Non-fatal injury	Rear-end	Dry	Daylight	Not Reported		
105	2727578	2011	8:00 PM	28-May-2011	Property damage only (no injuries)	Rear-end	Dry	Dark - lighted roadway	Clear		
106	2731716	2011	1:36 PM	09-Jun-2011	Non-fatal injury	Single vehicle crash	Dry	Daylight	Clear/Clear		
107	2735176	2011	3:38 AM	21-Jun-2011	Non-fatal injury	Single vehicle crash	Wet	Dark - lighted roadway	Not Reported		
108	2737363	2011	7:50 AM	01-Jul-2011	Non-fatal injury	Not reported	Dry	Daylight	Not Reported	P2:Pedalcyclist (bicyc)	
109	2741314	2011	3:16 PM	08-Jul-2011	Property damage only (no injuries)	Angle	Dry	Daylight	Clear/Clear		
110	2741206	2011	12:20 PM	09-Jul-2011	Property damage only (no injuries)	Rear-end	Dry	Daylight	Cloudy		
111	2745340	2011	5:20 PM	16-Jul-2011	Property damage only (no injuries)	Angle	Dry	Daylight	Cloudy		
112	2742769	2011	2:01 PM	18-Jul-2011	Property damage only (no injuries)	Rear-end	Wet	Daylight	Not Reported		
113	2750749	2011	8:44 PM	09-Aug-2011	Property damage only (no injuries)	Sideswipe, same direction	Wet	Dark - lighted roadway	Rain		
114	2752168	2011	10:34 AM	15-Aug-2011	Non-fatal injury	Angle	Wet	Daylight	Rain	P2:Pedalcyclist (bicyc)	
115	2753912	2011	3:42 PM	21-Aug-2011	Property damage only (no injuries)	Sideswipe, same direction	Dry	Daylight	Cloudy		
116	2754230	2011	9:13 AM	22-Aug-2011	Property damage only (no injuries)	Not reported	Dry	Daylight	Clear/Clear		
117	2757686	2011	4:24 AM	05-Sep-2011	Property damage only (no injuries)	Single vehicle crash	Dry	Dark - lighted roadway	Cloudy		
118	3373309	2011	5:50 AM	06-Sep-2011	Property damage only (no injuries)	Sideswipe, same direction	Wet	Dawn	Rain		
119	3372633	2011	11:35 AM	07-Sep-2011	Property damage only (no injuries)	Angle	Wet	Daylight	Cloudy/Rain		
120	3372601	2011	5:25 PM	12-Sep-2011	Property damage only (no injuries)	Rear-end	Dry	Daylight	Not Reported		
121	2767450	2011	8:07 PM	14-Sep-2011	Non-fatal injury	Angle	Dry	Dark - lighted roadway	Clear	P2:Pedestrian	ped
122	2765133	2011	9:35 AM	15-Sep-2011	Property damage only (no injuries)	Rear-end	Dry	Daylight	Cloudy		
123	3372643	2011	7:01 PM	11-Oct-2011	Property damage only (no injuries)	Rear-end	Dry	Dark - lighted roadway	Not Reported		
124	3372644	2011	2:35 PM	16-Oct-2011	Property damage only (no injuries)	Rear-end	Dry	Daylight	Not Reported		
125	3372651	2011	3:38 AM	29-Oct-2011	Property damage only (no injuries)	Single vehicle crash	Dry	Dark - lighted roadway	Clear		
126	2789384	2011	1:00 PM	30-Oct-2011	Property damage only (no injuries)	Angle	Dry	Daylight	Cloudy		
127	3372617	2011	1:04 PM	06-Nov-2011	Property damage only (no injuries)	Angle	Dry	Daylight	Clear		
128	2793850	2011	1:05 PM	09-Nov-2011	Property damage only (no injuries)	Sideswipe, same direction	Dry	Daylight	Not Reported		
129	2842280	2011	5:07 PM	09-Nov-2011	Property damage only (no injuries)	Angle	Dry	Dark - lighted roadway	Clear/Clear		
130	3168415	2011	11:26 AM	19-Nov-2011	Property damage only (no injuries)	Angle	Dry	Daylight	Clear		
131	3372657	2011	8:10 PM	24-Nov-2011	Non-fatal injury	Single vehicle crash	Dry	Dark - lighted roadway	Clear		
132	2928022	2011	2:21 AM	27-Nov-2011	Property damage only (no injuries)	Single vehicle crash	Dry	Dark - lighted roadway	Clear		

## Lynnway Crashes (2010 to 2012)

Count	Crash Number	Crash Year	Crash Time	Crash Date2	Crash_Severity	Manner of Collision	Road Surface	Ambient Light	Weather Condition	Non Motorized Collision	Bicycle or Pedestrian Involved
133	2921149	2011	9:56 AM	02-Dec-2011	Non-fatal injury	Single vehicle crash	Dry	Daylight	Clear	P2:Pedestrian	ped
134	2835768	2011	11:50 AM	17-Dec-2011	Property damage only (no injuries)	Single vehicle crash	Dry	Daylight	Clear		
135	2864478	2011	10:56 AM	22-Dec-2011	Property damage only (no injuries)	Head-on	Dry	Daylight	Clear		
136	3131775	2011	5:43 PM	23-Dec-2011	Property damage only (no injuries)	Single vehicle crash	Wet	Dark - lighted roadway	Cloudy		
137	2864731	2011	5:50 PM	23-Dec-2011	Non-fatal injury	Rear-end	Dry	Dark - lighted roadway	Cloudy/Cloudy		
138	2849868	2011	7:24 PM	23-Dec-2011	Non-fatal injury	Angle	Dry	Dark - roadway not lighted	Clear		
139	2898288	2012	9:35 AM	27-Jan-2012	Property damage only (no injuries)	Angle	Wet	Daylight	Rain		
140	3015418	2012	2:47 PM	01-Feb-2012	Property damage only (no injuries)	Rear-end	Dry	Daylight	Cloudy/Clear		
141	2997440	2012	1:40 PM	03-Feb-2012	Property damage only (no injuries)	Rear-end	Dry	Daylight	Clear		
142	2997430	2012	7:40 PM	03-Feb-2012	Property damage only (no injuries)	Angle	Dry	Daylight	Clear		
143	3038754	2012	12:59 PM	09-Feb-2012	Property damage only (no injuries)	Angle	Dry	Daylight	Clear		
144	2998036	2012	7:45 PM	09-Feb-2012	Property damage only (no injuries)	Rear-end	Dry	Daylight	Clear		
145	3376963	2012	4:45 PM	16-Dec-2012	Property damage only (no injuries)	Rear-end	Wet	Dusk	Not Reported		
146	3321830	2012	5:10 PM	18-Dec-2012	Property damage only (no injuries)	Rear-end	Dry	Dark - lighted roadway	Not Reported		
147	3039533	2012	3:21 PM	18-Feb-2012	Property damage only (no injuries)	Single vehicle crash	Dry	Daylight	Clear/Clear		
148	2960341	2012	9:34 PM	18-Feb-2012	Non-fatal injury	Single vehicle crash	Dry	Dark - lighted roadway	Clear		
149	2958525	2012	12:50 PM	24-Feb-2012	Non-fatal injury	Single vehicle crash	Dry	Daylight	Not Reported	P2:Pedestrian	ped
150	3162957	2012	4:40 PM	24-Feb-2012	Property damage only (no injuries)	Rear-end	Wet	Dusk	Rain		
151	2967341	2012	5:51 PM	24-Feb-2012	Property damage only (no injuries)	Single vehicle crash	Wet	Other	Rain/Rain	P2:Pedestrian	ped
152	3168281	2012	4:45 PM	16-Mar-2012	Property damage only (no injuries)	Sideswipe, same direction	Dry	Daylight	Cloudy		
153	3168287	2012	4:35 PM	21-Mar-2012	Non-fatal injury	Rear-end	Dry	Daylight	Clear		
154	3017825	2012	6:44 PM	23-Mar-2012	Property damage only (no injuries)	Angle	Dry	Dusk	Clear		
155	3038149	2012	7:46 PM	04-Apr-2012	Property damage only (no injuries)	Angle	Wet	Dark - lighted roadway	Rain		
156	3022045	2012	12:35 PM	05-Apr-2012	Non-fatal injury	Angle	Dry	Daylight	Clear	P2:Pedalcyclist (bicyc)	
157	3035631	2012	7:53 PM	13-Apr-2012	Property damage only (no injuries)	Rear-end	Dry	Dark - lighted roadway	Clear/Clear		
158	3109854	2012	11:05 AM	14-Apr-2012	Fatal injury	Single vehicle crash	Dry	Daylight	Clear	P1:Pedestrian / P	ped
159	3376886	2012	5:10 PM	20-Apr-2012	Property damage only (no injuries)	Single vehicle crash	Dry	Daylight	Not Reported	P2:Pedestrian / P	ped
160	3376896	2012	11:45 AM	29-Apr-2012	Non-fatal injury	Rear-end	Dry	Daylight	Clear		
161	3159349	2012	4:39 PM	05-May-2012	Property damage only (no injuries)	Sideswipe, same direction	Dry	Daylight	Cloudy		
162	3101970	2012	1:40 PM	14-May-2012	Not Reported	Rear-end	Dry	Daylight	Not Reported		
163	3392231	2012	4:53 PM	14-May-2012	Property damage only (no injuries)	Sideswipe, same direction	Wet	Daylight	Rain		
164	3102066	2012	3:23 PM	16-May-2012	Non-fatal injury	Rear-end	Dry	Daylight	Not Reported		
165	3216320	2012	6:40 AM	05-Jun-2012	Property damage only (no injuries)	Angle	Wet	Daylight	Rain/Cloudy		cyc
166	3125772	2012	9:25 PM	07-Jun-2012	Not Reported	Rear-end	Dry	Dark - lighted roadway	Cloudy		
167	3245242	2012	11:40 AM	30-Jun-2012	Property damage only (no injuries)	Head-on	Dry	Daylight	Clear/Clear		
168	3245241	2012	11:57 AM	30-Jun-2012	Property damage only (no injuries)	Sideswipe, opposite direction	Dry	Daylight	Clear		
169	3247878	2012	2:43 PM	08-Jul-2012	Property damage only (no injuries)	Rear-end	Dry	Daylight	Clear/Clear		
170	3168291	2012	5:30 AM	09-Jul-2012	Non-fatal injury	Rear-end	Dry	Dawn	Clear		
171	3185731	2012	8:30 AM	12-Jul-2012	Property damage only (no injuries)	Single vehicle crash	Dry	Daylight	Clear/Clear	P2:Pedestrian	ped
172	3376932	2012	8:40 PM	25-Jul-2012	Property damage only (no injuries)	Rear-end	Dry	Dark - roadway not lighted	Not Reported		
173	3298168	2012	7:05 AM	01-Aug-2012	Property damage only (no injuries)	Rear-end	Wet	Daylight	Cloudy		
174	3241472	2012	9:15 AM	03-Aug-2012	Property damage only (no injuries)	Single vehicle crash	Dry	Daylight	Clear		
175	3248238	2012	9:15 AM	10-Aug-2012	Property damage only (no injuries)	Angle	Dry	Daylight	Clear		
176	3244479	2012	8:39 PM	16-Aug-2012	Non-fatal injury	Single vehicle crash	Dry	Dark - lighted roadway	Clear	P3:Pedestrian	ped

## Lynnway Crashes (2010 to 2012)

Count	Crash Number	Crash Year	Crash Time	Crash Date2	Crash_Severity	Manner of Collision	Road Surface	Ambient Light	Weather Condition	Non Motorized Collision	Bicycle or Pedestrian Involved
177	3253584	2012	4:35 PM	18-Aug-2012	Property damage only (no injuries)	Rear-to-rear	Dry	Daylight	Not Reported		
178	3266575	2012	2:48 PM	25-Aug-2012	Property damage only (no injuries)	Rear-end	Dry	Daylight	Clear/Clear		
179	3250915	2012	9:45 AM	02-Sep-2012	Non-fatal injury	Angle	Dry	Daylight	Clear		
180	3263161	2012	7:30 AM	04-Sep-2012	Non-fatal injury	Rear-end	Wet	Daylight	Cloudy		
181	3252548	2012	11:55 AM	06-Sep-2012	Property damage only (no injuries)	Single vehicle crash	Dry	Daylight	Clear		
182	3286168	2012	1:18 AM	22-Sep-2012	Property damage only (no injuries)	Rear-end	Dry	Dark - lighted roadway	Clear		
183	3265566	2012	9:40 AM	24-Sep-2012	Property damage only (no injuries)	Rear-end	Dry	Daylight	Clear		
184	3379080	2012	4:18 PM	24-Sep-2012	Property damage only (no injuries)	Angle	Dry	Daylight	Not Reported		
185	3298670	2012	11:05 AM	10-Oct-2012	Unknown	Angle	Dry	Daylight	Clear		
186	3286682	2012	9:36 AM	16-Oct-2012	Non-fatal injury	Sideswipe, opposite direction	Dry	Daylight	Clear		
187	3376762	2012	11:13 AM	20-Oct-2012	Property damage only (no injuries)	Rear-end	Dry	Daylight	Not Reported		
188	3291213	2012	4:40 PM	24-Oct-2012	Property damage only (no injuries)	Sideswipe, same direction	Dry	Daylight	Clear		
189	3283690	2012	6:58 AM	25-Oct-2012	Non-fatal injury	Rear-end	Dry	Daylight	Clear		
190	3288558	2012	2:23 PM	29-Oct-2012	Property damage only (no injuries)	Rear-end	Wet	Daylight	Cloudy/Rain		
191	3379087	2012	9:48 AM	31-Oct-2012	Non-fatal injury	Sideswipe, same direction	Dry	Daylight	Cloudy		
192	3288657	2012	1:10 AM	10-Nov-2012	Property damage only (no injuries)	Rear-end	Dry	Dark - lighted roadway	Clear		
193	3308107	2012	11:10 AM	10-Nov-2012	Property damage only (no injuries)	Rear-end	Wet	Daylight	Clear		
194	3376957	2012	5:25 PM	10-Nov-2012	Non-fatal injury	Sideswipe, same direction	Dry	Dark - lighted roadway	Clear		
195	3325401	2012	9:23 PM	15-Nov-2012	Property damage only (no injuries)	Head-on	Dry	Dark - lighted roadway	Clear		
196	3295148	2012	5:30 PM	17-Nov-2012	Property damage only (no injuries)	Rear-end	Dry	Dark - lighted roadway	Not Reported		
197	3301801	2012	8:05 AM	03-Dec-2012	Property damage only (no injuries)	Rear-end	Dry	Daylight	Clear		
198	3376960	2012	5:57 PM	07-Dec-2012	Non-fatal injury	Rear-end	Wet	Dark - roadway not lighted	Not Reported	P3:Other non-motorized	ped
199	3321345	2012	9:30 AM	10-Dec-2012	Property damage only (no injuries)	Angle	Dry	Daylight	Clear		
200	3353663	2012	10:50 AM	14-Dec-2012	Property damage only (no injuries)	Single vehicle crash	Dry	Daylight	Clear/Clear		

# Carroll Parkway Crashes

Count	Crash Number	Crash Year	Crash	Crash Time	Crash Date 1	Crash Severity	Number of Vehicles	Total Nonfatal Injury	Total Fatal Injury	Manner of Collision	Road Surface	Ambient Light	Weather Condition	Nonmotorized Type	Bike or Pedestrian Crash
1	2578968	2010	6:08 PM	18-Mar-2010	Non-fatal injury	3	2	0	Rear-end	Dry	Daylight	Not Reported			
2	2592234	2010	6:08 PM	22-Mar-2010	Property damage only	2	0	0	Rear-end	Dry	Daylight	Not Reported			
3	2580981	2010	8:05 AM	29-Mar-2010	Property damage only	2	0	0	Rear-end	Wet	Daylight	Rain			
4	2675183	2010	00:00 AM	24-Dec-2010	Property damage only	1	0	0	Single vehicle crash	Dry	Dark - lighted roadway	Not Reported			
5	2590581	2010	00:00 AM	18-Apr-2010	Non-fatal injury	1	1	0	Single vehicle crash	Wet	Dark - lighted roadway	Not Reported			
6	2621169	2010	4:42 PM	12-Jul-2010	Property damage only	1	0	0	Single vehicle crash	Dry	Daylight	Clear			
7	2609916	2010	4:30 AM	12-Jun-2010	Property damage only	2	0	0	Rear-end	Dry	Dawn	Clear			
8	2630059	2010	10:35 AM	17-Aug-2010	Property damage only	2	0	0	Rear-end	Dry	Daylight	Not Reported			
9	2635079	2010	12:25 PM	31-Aug-2010	Non-fatal injury	2	2	0	Angle	Dry	Daylight	Clear			
10	2733595	2010	1:45 PM	06-Sep-2010	Non-fatal injury	2	1	0	Sideswipe, same direction	Dry	Daylight	Clear			
11	2656735	2010	1:47 AM	30-Oct-2010	Property damage only	4	0	0	Sideswipe, same direction	Dry	Dark - lighted roadway	Not Reported			
12	2667080	2010	5:43 AM	07-Nov-2010	Property damage only	1	0	0	Single vehicle crash	Dry	Daylight	Cloudy			
13	2617578	2010	6:44 PM	01-Jul-2010	Not Reported	2	0	0	Rear-end	Dry	Daylight	Not Reported			
14	2617584	2010	2:41 PM	05-Jul-2010	Not Reported	2	0	0	Rear-end	Dry	Daylight	Clear			
15	2628380	2010	12:10 PM	12-Aug-2010	Non-fatal injury	2	1	0	Angle	Dry	Daylight	Clear			
16	2663642	2010	3:42 PM	22-Nov-2010	Property damage only	2	0	0	Sideswipe, same direction	Dry	Daylight	Clear			
17	2683978	2011	11:31 PM	19-Jan-2011	Non-fatal injury	1	1	0	Single vehicle crash	Wet	Dark - lighted roadway	Cloudy/Snow			
18	2713520	2011	6:20 PM	09-Apr-2011	Property damage only	2	0	0	Angle	Dry	Daylight	Clear			
19	2716708	2011	8:00 AM	14-Apr-2011	Property damage only	2	0	0	Rear-end	Dry	Daylight	Cloudy			
20	2720788	2011	3:51 AM	01-May-2011	Property damage only	1	0	0	Single vehicle crash	Dry	Dark - lighted roadway	Clear			
21	2737365	2011	11:06 AM	04-Jul-2011	Property damage only	2	0	0	Sideswipe, same direction	Dry	Daylight	Clear			
22	2759499	2011	1:30 PM	26-Aug-2011	Property damage only	2	0	0	Sideswipe, same direction	Dry	Daylight	Clear			
23	2760300	2011	8:15 PM	26-Aug-2011	Property damage only	1	0	0	Single vehicle crash	Dry	Dark - lighted roadway	Clear		cyc	
24	2754783	2011	8:05 AM	27-Aug-2011	Not Reported	1	0	0	Single vehicle crash	Dry	Daylight	Clear			
25	2765034	2011	6:14 PM	06-Sep-2011	Property damage only	4	0	0	Rear-end	Wet	Daylight	Rain			
26	2782972	2011	3:00 PM	13-Oct-2011	Property damage only	1	0	0	Single vehicle crash	Wet	Daylight	Not Reported			
27	2791147	2011	11:57 PM	15-Oct-2011	Non-fatal injury	2	5	0	Rear-end	Dry	Dark - lighted roadway	Not Reported			
28	2791148	2011	1:35 AM	03-Nov-2011	Non-fatal injury	1	1	0	Single vehicle crash	Dry	Dark - lighted roadway	Cloudy			
29	2844102	2011	1:15 AM	23-Dec-2011	Not Reported	1	0	0	Single vehicle crash	Wet	Dark - lighted roadway	Cloudy/Rain			
30	3372604	2011	5:15 PM	16-Sep-2011	Property damage only	1	0	0	Single vehicle crash	Dry	Daylight	Clear			
31	3280748	2012	11:31 AM	12-Oct-2012	Property damage only	2	0	0	Rear-end	Wet	Daylight	Cloudy/Rain			
32	2864362	2012	6:55 PM	12-Jan-2012	Property damage only	3	0	0	Rear-end	Dry	Dark - lighted roadway	Clear			
33	3004246	2012	6:45 AM	02-Apr-2012	Non-fatal injury	1	1	0	Single vehicle crash	Dry	Daylight	Cloudy			
34	3109858	2012	3:20 PM	22-May-2012	Not Reported	2	0	0	Angle	Wet	Daylight	Not Reported			
35	3138861	2012	9:40 PM	15-Jun-2012	Not Reported	2	0	0	Sideswipe, same direction	Dry	Dark - lighted roadway	Clear			
36	3153148	2012	1:25 PM	20-Jun-2012	Property damage only	2	0	0	Sideswipe, same direction	Dry	Daylight	Clear			
37	3179571	2012	9:26 PM	29-Jun-2012	Non-fatal injury	1	1	0	Single vehicle crash	Dry	Dark - lighted roadway	Clear	P2:Pedestrian	ped	
38	3279026	2012	12:53 PM	14-Aug-2012	Non-fatal injury	1	1	0	Single vehicle crash	Dry	Daylight	Clear			
39	3246217	2012	5:15 PM	14-Aug-2012	Non-fatal injury	2	1	0	Sideswipe, same direction	Dry	Daylight	Clear			
40	3230906	2012	9:10 AM	04-Aug-2012	Property damage only	1	0	0	Single vehicle crash	Dry	Daylight	Clear			
41	3285763	2012	3:21 AM	03-Nov-2012	Property damage only	1	0	0	Single vehicle crash	Dry	Dark - lighted roadway	Clear			

# **APPENDIX F**

## **Crash Rate Worksheets**



## SEGMENT CRASH RATE WORKSHEET

CITY/TOWN : Lynn COUNT DATE : 28-May-15

DISTRICT : 4

### ~ SEGMENT DATA ~

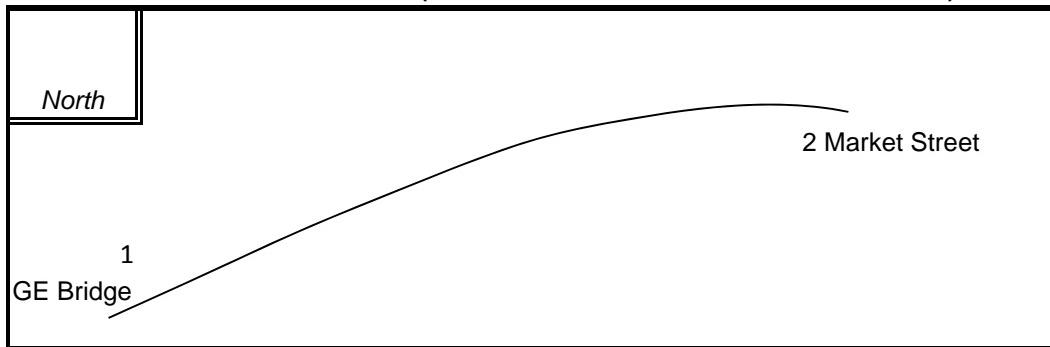
ROADWAY NAME: Lynnway/Route 1A

START POI General Edward Bridge

END POINT Market Street

FUNCTIONAL CLASSIFICATION OF ROADWAY: Principal Arterial

### ROADWAY DIAGRAM (LABEL ROADWAY AND CROSS STREETS)



### AVERAGE DAILY TRAFFIC

SEGMENT LENGTH IN MILES ( L ): 1.5

AVERAGE DAILY TRAFFIC VOLUME ( V ): 37,700

TOTAL # OF CRASHES:

# OF  
YEARS :

AVERAGE # OF  
CRASHES PER YEAR ( A ) :

**66.67**

CRASH RATE  
CALCULATION :

**3.23**

RATE =

$$\frac{( A * 1,000,000 )}{( L * V * 365 )}$$

Comments :

Project Title & Date: Lynnway/Route 1A/Carroll Parkway Study



## SEGMENT CRASH RATE WORKSHEET

CITY/TOWN : Lynn COUNT DATE : 28-May-15

DISTRICT : 4

### ~ SEGMENT DATA ~

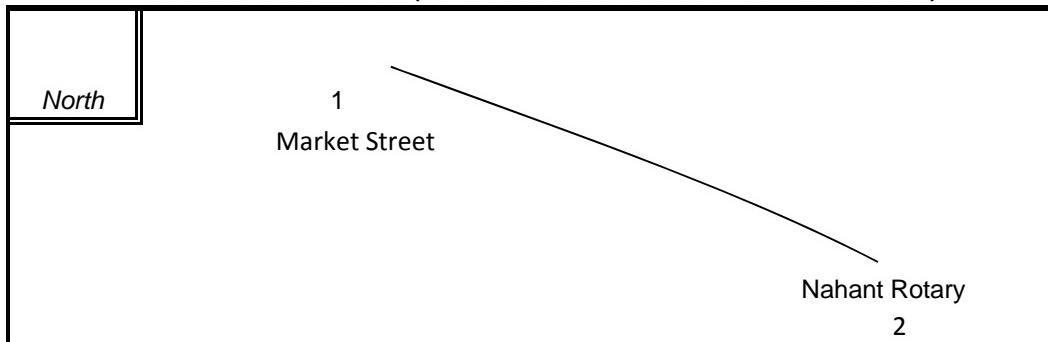
ROADWAY NAME: Carroll Parkway

START POI General Edward Bridge

END POINT Nahant Rotary

FUNCTIONAL CLASSIFICATION OF ROADWAY: Principal Arterial

### ROADWAY DIAGRAM (LABEL ROADWAY AND CROSS STREETS)



### AVERAGE DAILY TRAFFIC

SEGMENT LENGTH IN MILES ( L ): 0.5

AVERAGE DAILY TRAFFIC VOLUME ( V ): 29,300

TOTAL # OF CRASHES:

40

# OF  
YEARS :

3

AVERAGE # OF  
CRASHES PER YEAR ( A ) :

13.33

CRASH RATE  
CALCULATION :

2.49

RATE = 
$$\frac{(A * 1,000,000)}{(L * V * 365)}$$

Comments :

Project Title & Date: Lynnway/Route 1A/Carroll Parkway Study



## INTERSECTION CRASH RATE WORKSHEET

CITY/TOWN : Lynn COUNT DATE : 28-Apr-15

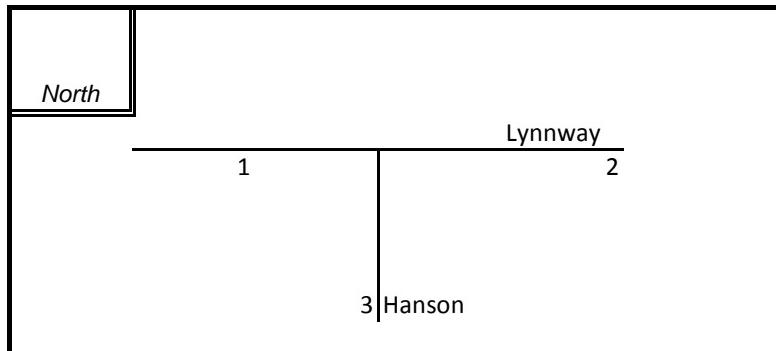
DISTRICT : 4 UNSIGNALIZED :  SIGNALIZED :  Yes

### ~ INTERSECTION DATA ~

MAJOR STREET : Lynnway/Route 1A

MINOR STREET(S) : Hanson St

INTERSECTION  
DIAGRAM  
(Label Approaches)



PEAK HOUR VOLUMES						Total Peak Hourly Approach Volume
APPROACH :	1	2	3	4	5	
DIRECTION :	NB	SB	WB			
PEAK HOURLY VOLUMES (AM/PM) :	2,190	1,240	175			3,605

" K " FACTOR :  APPROACH VOLUME :   
TOTAL # OF CRASHES :  # OF YEARS :  AVERAGE # OF CRASHES PER YEAR ( A ) :

CRASH RATE CALCULATION :  RATE = 
$$\frac{(A * 1,000,000)}{(V * 365)}$$

Comments :

Project Title & Date: Lynnway/Route 1A/Carroll Parkway Study



## INTERSECTION CRASH RATE WORKSHEET

CITY/TOWN : Lynn COUNT DATE : 28-May-15

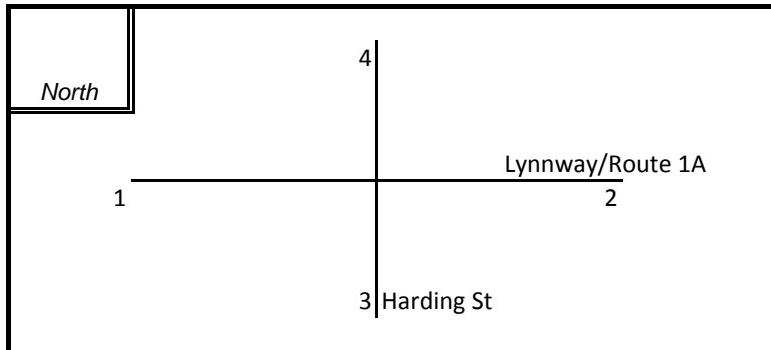
DISTRICT : 4 UNSIGNALIZED :  SIGNALIZED :  Yes

### ~ INTERSECTION DATA ~

MAJOR STREET : Lynnway/Route 1A

MINOR STREET(S) : Harding St

INTERSECTION  
DIAGRAM  
(Label Approaches)



### PEAK HOUR VOLUMES

APPROACH :	1	2	3	4	5	Total Peak Hourly Approach Volume
DIRECTION :	NB	SB	WB	EB		
PEAK HOURLY VOLUMES (AM/PM) :	2340	1280	80	30		3,730

" K " FACTOR :  APPROACH VOLUME :

TOTAL # OF CRASHES :  # OF YEARS :  AVERAGE # OF CRASHES PER YEAR ( A ) :

CRASH RATE CALCULATION :  RATE = 
$$\frac{(A * 1,000,000)}{(V * 365)}$$

Comments :

Project Title & Date: Lynnway/Route 1A/Carroll Parkway Study



## INTERSECTION CRASH RATE WORKSHEET

CITY/TOWN : Lynn COUNT DATE : 28-May-15

DISTRICT : 4 UNSIGNALIZED :  SIGNALIZED :  Yes

### ~ INTERSECTION DATA ~

MAJOR STREET : Lynnway/Route 1A

MINOR STREET(S) : Commercial Street

INTERSECTION  
DIAGRAM  
(Label Approaches)



### PEAK HOUR VOLUMES

APPROACH :	1	2	3	4	5	Total Peak Hourly Approach Volume
DIRECTION :	NB	SB	WB	EB		
PEAK HOURLY VOLUMES (AM/PM) :	2,505	1,390	0	650		4,545

"K" FACTOR :

0.090

APPROACH VOLUME :

50,500

TOTAL # OF CRASHES :  59

# OF YEARS :  3

AVERAGE # OF CRASHES PER YEAR (A) :  19.67

CRASH RATE CALCULATION :  1.07

$$\text{RATE} = \frac{(A * 1,000,000)}{(V * 365)}$$

Comments :

Project Title & Date: Lynnway/Route 1A/Carroll Parkway Study



## INTERSECTION CRASH RATE WORKSHEET

CITY/TOWN : Lynn COUNT DATE : 28-May-15

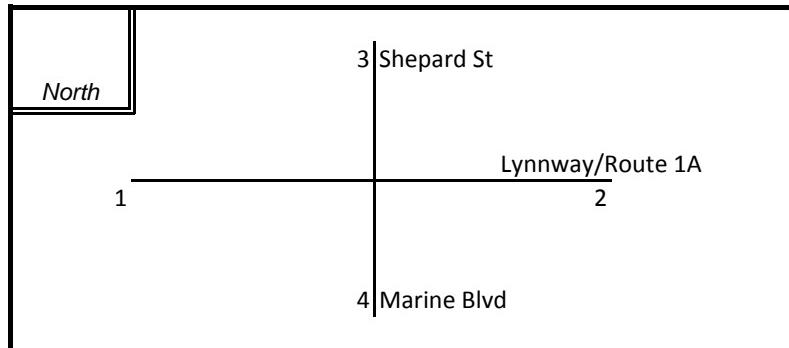
DISTRICT : 4 UNSIGNALIZED :  SIGNALIZED :  Yes

### ~ INTERSECTION DATA ~

MAJOR STREET : Lynnway/Route 1A

MINOR STREET(S) : Marine Blvd  
Shepard Street

INTERSECTION  
DIAGRAM  
(Label Approaches)



### PEAK HOUR VOLUMES

APPROACH :	1	2	3	4	5	Total Peak Hourly Approach Volume
DIRECTION :	NB	SB	EB	WB		
PEAK HOURLY VOLUMES (AM/PM) :	2,300	1,400	70	25		3,795

" K " FACTOR :

APPROACH VOLUME :

TOTAL # OF CRASHES :

# OF YEARS :

AVERAGE # OF CRASHES PER YEAR ( A ) :

CRASH RATE CALCULATION :  RATE = 
$$\frac{(A * 1,000,000)}{(V * 365)}$$

Comments :

Project Title & Date: Lynnway/Route 1A/Carroll Parkway Study



## INTERSECTION CRASH RATE WORKSHEET

CITY/TOWN : Lynn COUNT DATE : 28-May-15

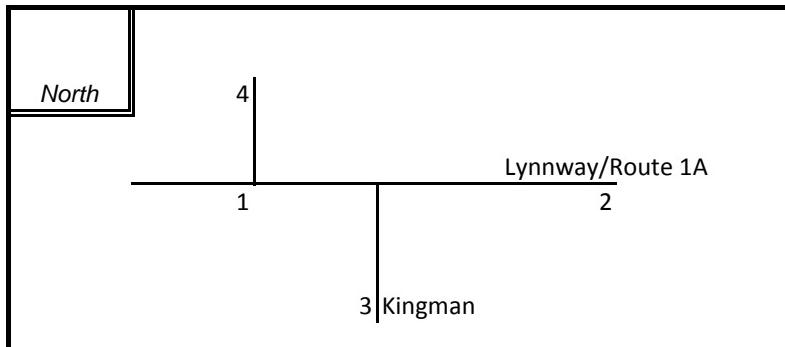
DISTRICT : 4 UNSIGNALIZED :  SIGNALIZED :  Yes

### ~ INTERSECTION DATA ~

MAJOR STREET : Lynnway/Route 1A

MINOR STREET(S) : Kingman Street

INTERSECTION  
DIAGRAM  
(Label Approaches)



### PEAK HOUR VOLUMES

APPROACH :	1	2	3	4	5	Total Peak Hourly Approach Volume
DIRECTION :	NB	SB	WB	EB		
PEAK HOURLY VOLUMES (AM/PM) :	2,185	1,405	220	180		3,990

" K " FACTOR :

0.090

APPROACH VOLUME :

44,333

TOTAL # OF CRASHES :  45

# OF YEARS :  3

AVERAGE # OF CRASHES PER YEAR ( A ) :  15.00

CRASH RATE CALCULATION :

0.93

RATE =  $\frac{(A * 1,000,000)}{(V * 365)}$

Comments :

Project Title & Date:

Lynnway/Route 1A/Carroll Parkway Study



## INTERSECTION CRASH RATE WORKSHEET

---

CITY/TOWN : Lynnway/Route 1A COUNT DATE : May-15

DISTRICT : 4 UNSIGNALIZED :  SIGNALIZED :  Yes

---

**~ INTERSECTION DATA ~**

---

MAJOR STREET : Lynnway/Route 1A

MINOR STREET(S) : Market St

---

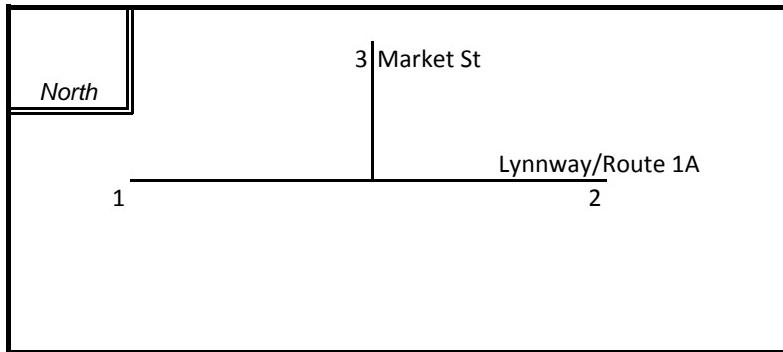


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**INTERSECTION  
DIAGRAM  
(Label Approaches)**



**PEAK HOUR VOLUMES**

APPROACH :	1	2	3	4	5	Total Peak Hourly Approach Volume
DIRECTION :	NB	SB	EB			
PEAK HOURLY VOLUMES (AM/PM) :	2,265	970	230			3,465

"K" FACTOR :  APPROACH VOLUME :

TOTAL # OF CRASHES :  # OF YEARS :  AVERAGE # OF CRASHES PER YEAR (A) :

---

**CRASH RATE CALCULATION :**  RATE = 
$$\frac{(A * 1,000,000)}{(V * 365)}$$

Comments :

Project Title & Date: Lynnway/Route 1A/Carroll Parkway Study



## INTERSECTION CRASH RATE WORKSHEET

CITY/TOWN : Lynn and Nahant COUNT DATE : 28-May-15

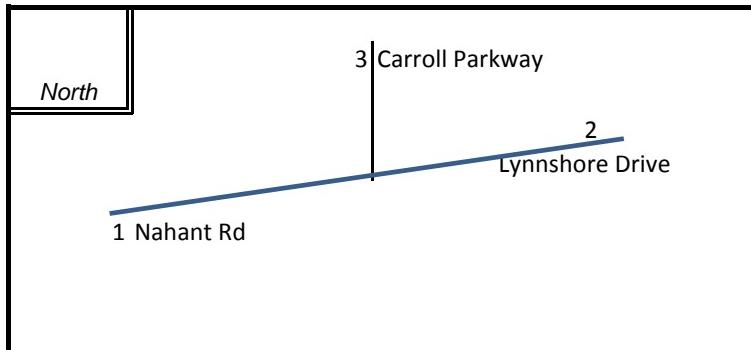
DISTRICT : 4 UNSIGNALIZED : Yes SIGNALIZED :

### ~ INTERSECTION DATA ~

MAJOR STREET : Carroll Parkway

MINOR STREET(S) : Lynnshore Drive/Nahant Road

INTERSECTION  
DIAGRAM  
(Label Approaches)



### PEAK HOUR VOLUMES

APPROACH :	1	2	3	4	5	Total Peak Hourly Approach Volume
DIRECTION :	NB	SB	EB			
PEAK HOURLY VOLUMES (AM/PM) :	490	800	1,750			3,040

"K" FACTOR : **0.090** APPROACH VOLUME : **33,778**

TOTAL # OF CRASHES : **33** # OF YEARS : **3** AVERAGE # OF CRASHES PER YEAR (A) : **11.00**

CRASH RATE CALCULATION : **0.89** RATE =  $\frac{(A * 1,000,000)}{(V * 365)}$

Comments :

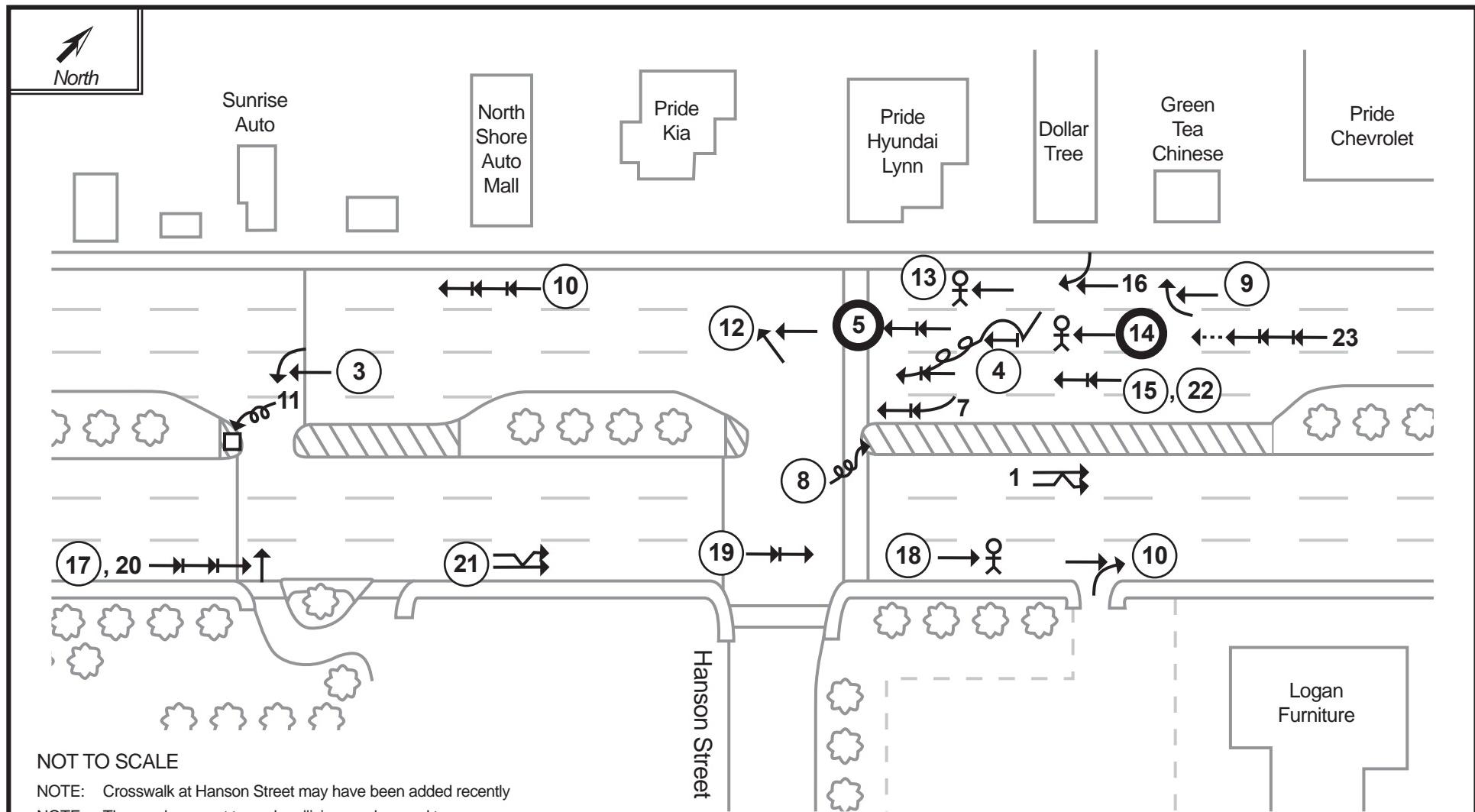
Project Title & Date:

# **APPENDIX G**

## **Collision Diagrams**



**Figure 1**  
**Lynnway, Lynn, MA**  
**Section 1: Hanson Street**



NOT TO SCALE

NOTE: Crosswalk at Hanson Street may have been added recently

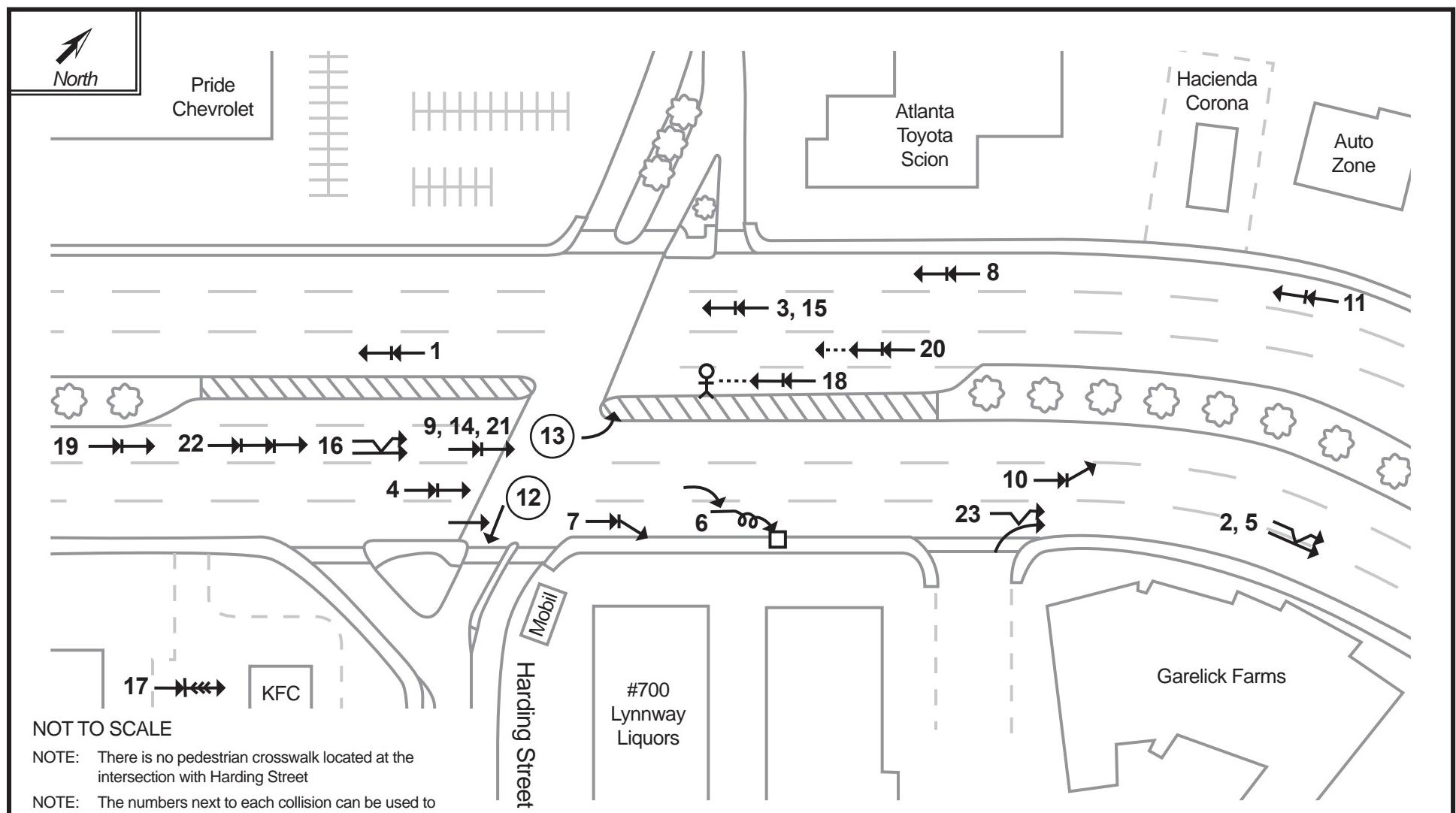
NOTE: The numbers next to each collision can be used to look up crash record information included in the Appendix

SYMBOLS	TYPES OF CRASH	SEVERITY
→ Moving Vehicle	→ Parked Vehicle	
→ Backing Vehicle	→ Fixed Object	
→ Non-Involved Vehicle	→ Bicycle	
→ Pedestrian	→ Animal	
→ Non-Involved Pedestrian		
	↔ ↔ Head On	
	→ ↘ Angle	
	↔ → Rear End	
	→ ↗ Sideswipe	
	→ ↙ Out of Control	
		○ Injury Accident
		● Fatal Accident

Collision Diagram  
Section 1: Hanson Street

Figure Number	Final Sketch Number	Crash Number	Crash Time	Crash Date1	Crash Severity	Manner of Collision	Vehicle Traveled Direction	Road Surface Condition	Ambient Light Condition	Weather Condition	Bike or Ped
1	1	2577195	10:45 PM	16-Mar-2010	Property damage only (n)	Sideswipe, same direction	V1:Northbound / V2:Northbound	Dry	Dark - lighted roadway	Clear	
1	2	2577960	12:30 PM	20-Mar-2010	Property damage only (n)	Angle	V1:Northbound / V2:Not reported	Dry	Daylight	Not Reported	
1	3	2579796	1:33 PM	23-Mar-2010	Non-fatal injury	Angle	V1:Southbound / V2:Southbound	Wet	Daylight	Cloudy	
1	4	2610582	1:10 PM	12-Jun-2010	Non-fatal injury	Rear-end	V1:Southbound / V2:Southbound / V3	Dry	Daylight	Clear	
1	5	2626781	4:31 PM	30-Jul-2010	Fatal injury	Rear-end	V1:Southbound / V2:Southbound	Dry	Daylight	Clear	
1	6	2676736	1:45 PM	28-Dec-2010	Non-fatal injury	Angle	V1:Northbound / V2:Westbound	Wet	Daylight	Not Reported	
1	7	2678147	11:12 AM	06-Jan-2011	Property damage only (n)	Rear-end	V1:Southbound / V2:Southbound	Dry	Daylight	Clear	
1	8	2680257	2:41 PM	12-Jan-2011	Non-fatal injury	Single vehicle crash	V1:Northbound	Snow	Daylight	Cloudy/Snow	
1	9	2690357	11:00 AM	22-Jan-2011	Non-fatal injury	Angle	V1:Southbound / V2:Southbound	Wet	Daylight	Snow	
1	10	2726956	2:20 PM	20-May-2011	Non-fatal injury	Rear-end	V1:Southbound / V2:Southbound / V3	Dry	Daylight	Not Reported	
1	11	2835768	11:50 AM	17-Dec-2011	Property damage only (n)	Single vehicle crash	V1:Southbound	Dry	Daylight	Clear	
1	12	2849868	7:24 PM	23-Dec-2011	Non-fatal injury	Angle	V1:Southbound / V2:Southbound	Dry	Dark - roadway not lighted	Clear	
1	13	2958525	12:50 PM	24-Feb-2012	Non-fatal injury	Single vehicle crash	V1:Southbound	Dry	Daylight	Not Reported	ped
1	14	3109854	11:05 AM	14-Apr-2012	Fatal injury	Single vehicle crash	V1:Southbound / V2:Southbound	Dry	Daylight	Clear	ped
1	15	3168291	5:30 AM	09-Jul-2012	Non-fatal injury	Rear-end	V1:Southbound / V2:Southbound	Dry	Dawn	Clear	
1	16	3372633	11:35 AM	07-Sep-2011	Property damage only (n)	Angle	V1:Southbound / V2:Southbound	Wet	Daylight	Cloudy/Rain	
1	17	3376756									
1	18	3376886	5:10 PM	20-Apr-2012	Property damage only (n)	Single vehicle crash	V1:Northbound	Dry	Daylight	Not Reported	ped
1	19	3376896	11:45 AM	29-Apr-2012	Non-fatal injury	Rear-end	V1:Northbound / V2:Northbound	Dry	Daylight	Clear	
1	20	3376940									
1	21	3376957	5:25 PM	10-Nov-2012	Non-fatal injury	Sideswipe, same direction	V1:Northbound / V2:Northbound	Dry	Dark - lighted roadway	Clear	
1	22	3376960	5:57 PM	07-Dec-2012	Non-fatal injury	Rear-end	V1:Southbound / V2:Southbound	Wet	Dark - roadway not lighted	Not Reported	ped
1	23	3376963	4:45 PM	16-Dec-2012	Property damage only (n)	Rear-end	V1:Southbound / V2:Southbound / V3	Wet	Dusk	Not Reported	

**Figure 2**  
**Lynnway, Lynn, MA**  
**Section 2: Harding Street**

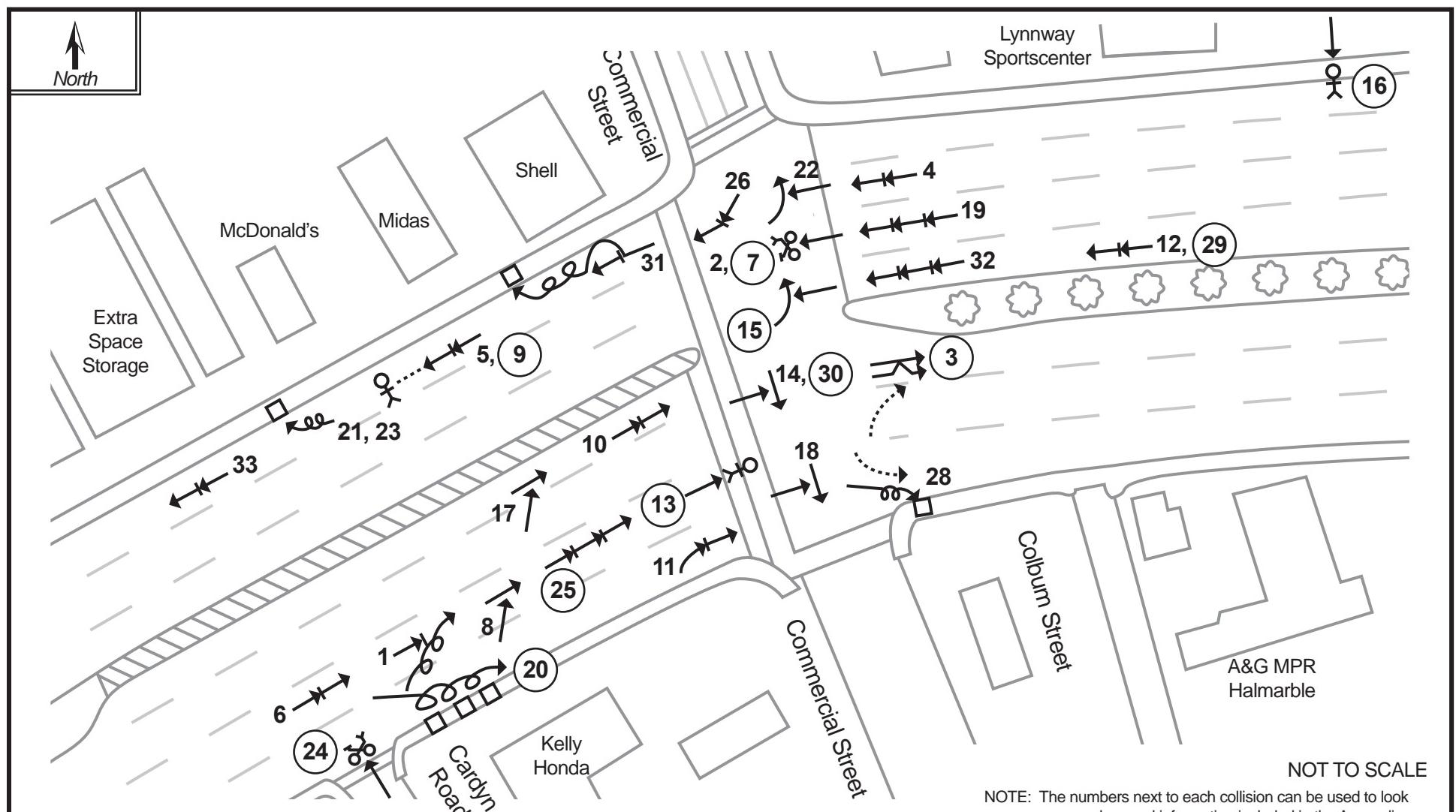


SYMBOLS	TYPES OF CRASH	SEVERITY
→ Moving Vehicle	→ Parked Vehicle	
→ Backing Vehicle	□ Fixed Object	
→ Non-Involved Vehicle	→ Bicycle	
→ Pedestrian	→ Animal	
→ Non-Involved Pedestrian		
	↔ Head On	
	↓ ↙ Angle	
	→ Rear End	
	↔ Sideswipe	
	↔ Out of Control	
		○ Injury Accident
		● Fatal Accident

Collision Diagram  
Section 2: Harding Street

Figure Number	Final Sketch Number	Crash Number	Crash Time	Crash Date1	Crash Severity	Manner of Collision	Vehicle Traveled Direction	Road Surface Condition	Ambient Light Condition	Weather Condition	Bike or Ped
2 1	2577961	2:00 PM	20-Mar-2010	Property damage only (n)	Rear-end	V1:Southbound / V2:Southbound	Dry	Daylight	Not Reported		
2 2	2595348	12:55 PM	04-May-2010	Property damage only (n)	Sideswipe, same direction	V1:Northbound / V2:Northbound	Dry	Daylight	Clear		
2 3	2600183	2:05 PM	19-May-2010	Property damage only (n)	Rear-end	V1:Southbound / V2:Southbound	Wet	Daylight	Not Reported		
2 4	2617583	12:16 PM	05-Jul-2010	Not Reported	Rear-end	V1:Northbound / V2:Northbound	Dry	Daylight	Clear		
2 5	2622069	2:40 AM	14-Jul-2010	Not Reported	Sideswipe, same direction	V1:Northbound / V2:Northbound	Dry	Dark - lighted roadway	Clear		
2 6	2625622	5:08 PM	01-Aug-2010	Property damage only (n)	Angle	V1:Northbound / V2:Northbound	Dry	Daylight	Clear		
2 7	2632037	7:38 AM	24-Aug-2010	Property damage only (n)	Rear-end	V1:Northbound / V2:Northbound	Dry	Daylight	Not Reported		
2 8	2643257	10:20 PM	26-Aug-2010	Property damage only (n)	Angle	V1:Southbound / V2:Not reported / V3	Dry	Dark - lighted roadway	Clear		
2 9	2650100	6:33 AM	12-Oct-2010	Property damage only (n)	Rear-end	V1:Northbound / V2:Northbound	Wet	Dark - lighted roadway	Cloudy		
2 10	2653051	00:00 AM	19-Oct-2010	Property damage only (n)	Rear-end	V1:Northbound / V2:Northbound / V3	Dry	Dark - lighted roadway	Clear		
2 11	2656727	3:20 PM	02-Nov-2010	Property damage only (n)	Rear-end	V1:Southbound / V2:Southbound	Dry	Daylight	Clear		
2 12	2663641	8:50 AM	20-Nov-2010	Non-fatal injury	Angle	V1:Southbound / V2:Northbound	Dry	Daylight	Not Reported		
2 13	2664787	9:02 PM	28-Nov-2010	Non-fatal injury	Single vehicle crash	V1:Northbound	Dry	Dark - lighted roadway	Clear		
2 14	3101970	1:40 PM	14-May-2012	Not Reported	Rear-end	V1:Northbound / V2:Northbound	Dry	Daylight	Not Reported		
2 15	3125772	9:25 PM	07-Jun-2012	Not Reported	Rear-end	V1:Southbound / V2:Southbound	Dry	Dark - lighted roadway	Cloudy		
2 16	3168281	4:45 PM	16-Mar-2012	Property damage only (n)	Sideswipe, same direction	V1:Northbound / V2:Northbound	Dry	Daylight	Cloudy		
2 17	3253584	4:35 PM	18-Aug-2012	Property damage only (n)	Rear-to-rear	V1:Not reported / V2:Not reported	Dry	Daylight	Not Reported		
2 18	3288558	2:23 PM	29-Oct-2012	Property damage only (n)	Rear-end	V1:Southbound / V2:Southbound	Wet	Daylight	Cloudy/Rain		
2 19	3295148	5:30 PM	17-Nov-2012	Property damage only (n)	Rear-end	V1:Northbound / V2:Northbound	Dry	Dark - lighted roadway	Not Reported		
2 20	3298168	7:05 AM	01-Aug-2012	Property damage only (n)	Rear-end	V1:Southbound / V2:Southbound	Wet	Daylight	Cloudy		
2 21	3321830	5:10 PM	18-Dec-2012	Property damage only (n)	Rear-end	V1:Northbound / V2:Northbound	Dry	Dark - lighted roadway	Not Reported		
2 22	3372644	2:35 PM	16-Oct-2011	Property damage only (n)	Rear-end	V1:Northbound / V2:Northbound / V3	Dry	Daylight	Not Reported		
2 23	3373309	5:50 AM	06-Sep-2011	Property damage only (n)	Sideswipe, same direction	V1:Northbound / V2:Northbound	Wet	Dawn	Rain		

**Figure 3**  
**Lynnway, Lynn, MA**  
**Section 3: Commercial Street**



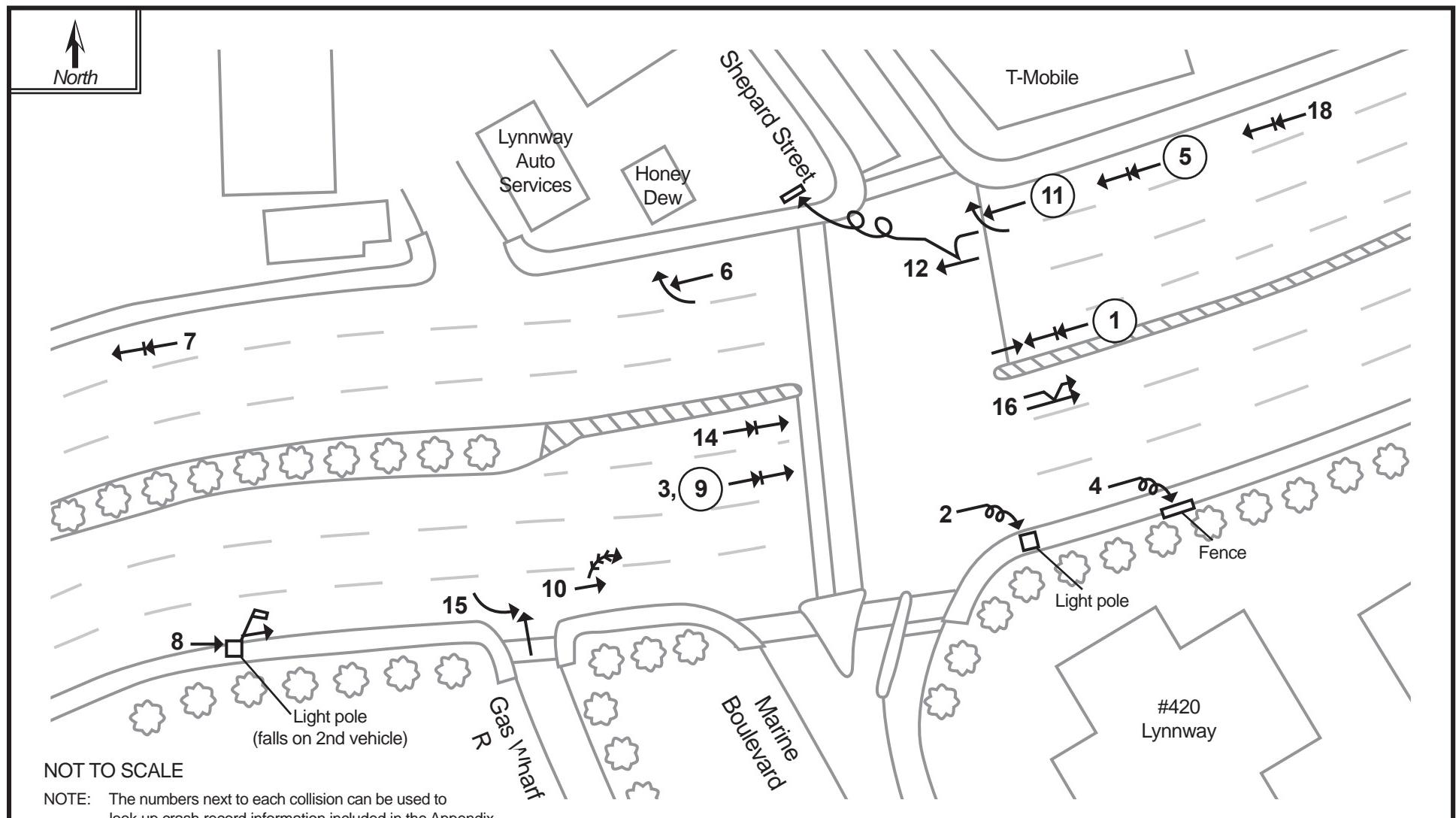
SYMBOLS	TYPES OF CRASH	SEVERITY
→ Moving Vehicle	→ Parked Vehicle	
→ Backing Vehicle	□ Fixed Object	
→ Non-Involved Vehicle	○ Bicycle	
→ Pedestrian	○ Animal	
→ Non-Involved Pedestrian		
	→ → Head On	
	→ ↘ Angle	
	→ → Rear End	
	→ ↗ Sideswipe	
	→ ↙ Out of Control	
		○ Injury Accident
		○ Fatal Accident

Collision Diagram  
Section 3: Commercial Street

Figure Number	Final Sketch Number	Crash Number	Crash Time	Crash Date1	Crash Severity	Manner of Collision	Vehicle Traveled Direction	Road Surface Condition	Ambient Light Condition	Weather Condition	Bike or Ped
3 1	2577953	8:43 PM	15-Mar-2010	Property damage only (n)	Angle	V1:Westbound / V2:Northbound / V3	Wet	Dark - lighted roadway	Rain		
3 2	2590566	10:20 AM	02-Apr-2010	Property damage only (n)	Angle	V1:Northbound	Dry	Daylight	Not Reported	cyc	
3 3	2592258	6:45 AM	19-Apr-2010	Non-fatal injury	Sideswipe, same direction	V1:Northbound / V2:Northbound / V3	Dry	Daylight	Clear		
3 4	2597879	6:40 AM	11-May-2010	Property damage only (n)	Rear-end	V1:Southbound / V2:Southbound	Dry	Daylight	Not Reported		
3 5	2599760	2:50 PM	19-May-2010	Property damage only (n)	Rear-end	V1:Southbound / V2:Southbound	Wet	Daylight	Not Reported		
3 6	2607139	1:52 PM	29-May-2010	Property damage only (n)	Rear-end	V1:Northbound / V2:Northbound	Dry	Daylight	Clear		
3 7	2613172	3:24 PM	20-Jun-2010	Not Reported	Angle	V1:Southbound	Dry	Daylight	Not Reported	ped	
3 8	2623109	7:43 PM	18-Jun-2010	Property damage only (n)	Angle	V1:Northbound / V2:Northbound	Dry	Daylight	Clear		
3 9	2647165	11:20 AM	02-Oct-2010	Non-fatal injury	Rear-end	V1:Southbound / V2:Southbound	Dry	Daylight	Clear		
3 10	2647241	1:15 PM	01-Oct-2010	Property damage only (n)	Rear-end	V1:Northbound	Wet	Daylight	Rain		
3 11	2653159	9:50 AM	15-Oct-2010	Property damage only (n)	Rear-end	V1:Northbound / V2:Northbound	Dry	Daylight	Cloudy		
3 12	2654018	6:57 AM	26-Oct-2010	Property damage only (n)	Rear-end	V1:Southbound / V2:Southbound	Wet	Daylight	Clear		
3 13	2671213	00:00 AM	13-Dec-2010	Not Reported	Single vehicle crash	V1:Not reported	Wet	Dark - lighted roadway	Cloudy/Rain		
3 14	2675182	8:42 AM	23-Dec-2010	Property damage only (n)	Angle	V1:Northbound / V2:Eastbound	Wet	Daylight	Cloudy/Other		
3 15	2680658	9:03 AM	16-Jan-2011	Non-fatal injury	Angle	V1:Southbound / V2:Westbound	Dry	Daylight	Clear		
3 16	2689459	7:20 AM	05-Feb-2011	Non-fatal injury	Single vehicle crash	V1:Eastbound	Ice	Daylight	Clear	ped	
3 17	2690159	11:23 AM	11-Jan-2011	Property damage only (n)	Angle	V1:Northbound / V2:Northbound	Wet	Daylight	Not Reported		
3 18	2690161	9:30 AM	26-Jan-2011	Property damage only (n)	Angle	V1:Eastbound / V2:Northbound	Dry	Daylight	Not Reported		
3 19	2727578	8:00 PM	28-May-2011	Property damage only (n)	Rear-end	V1:Southbound / V2:Southbound / V3	Dry	Dark - lighted roadway	Clear		
3 20	2735176	3:38 AM	21-Jun-2011	Non-fatal injury	Single vehicle crash	V1:Northbound	Wet	Dark - lighted roadway	Not Reported		
3 21	2757686	4:24 AM	05-Sep-2011	Property damage only (n)	Single vehicle crash	V1:Southbound	Dry	Dark - lighted roadway	Cloudy		
3 22	2789384	1:00 PM	30-Oct-2011	Property damage only (n)	Angle	V1:Westbound / V2:Southbound	Dry	Daylight	Cloudy		
3 23	2960341	9:34 PM	18-Feb-2012	Non-fatal injury	Single vehicle crash	V1:Southbound	Dry	Dark - lighted roadway	Clear		
3 24	3022045	12:35 PM	05-Apr-2012	Non-fatal injury	Angle	V1:Westbound	Dry	Daylight	Clear	cyc	
3 25	3102066	3:23 PM	16-May-2012	Non-fatal injury	Rear-end	V1:Northbound / V2:Northbound / V3	Dry	Daylight	Not Reported		
3 26	3162957	4:40 PM	24-Feb-2012	Property damage only (n)	Rear-end	V1:Southbound / V2:Southbound	Wet	Dusk	Rain		
3 27	3168287	4:35 PM	21-Mar-2012	Non-fatal injury	Rear-end	V1:Southbound / V2:Southbound / V3	Dry	Daylight	Clear		
3 28	3252548	11:55 AM	06-Sep-2012	Property damage only (n)	Single vehicle crash	V1:Northbound	Dry	Daylight	Clear		
3 29	3283690	6:58 AM	25-Oct-2012	Non-fatal injury	Rear-end	V1:Southbound / V2:Southbound	Dry	Daylight	Clear		
3 30	3286682	9:36 AM	16-Oct-2012	Non-fatal injury	Sideswipe, opposite direction	V1:Eastbound / V2:Northbound	Dry	Daylight	Clear		
3 31	3288657	1:10 AM	10-Nov-2012	Property damage only (n)	Rear-end	V1:Southbound / V2:Southbound	Dry	Dark - lighted roadway	Clear		
3 32	3372643	7:01 PM	11-Oct-2011	Property damage only (n)	Rear-end	V1:Southbound / V2:Southbound / V3	Dry	Dark - lighted roadway	Not Reported		
3 33	3376762	11:13 AM	20-Oct-2012	Property damage only (n)	Rear-end	V1:Southbound / V2:Southbound	Dry	Daylight	Not Reported		

NOT TO SCALE

Figure 4  
Lynnway, Lynn, MA  
Section 4: Shepard Marine



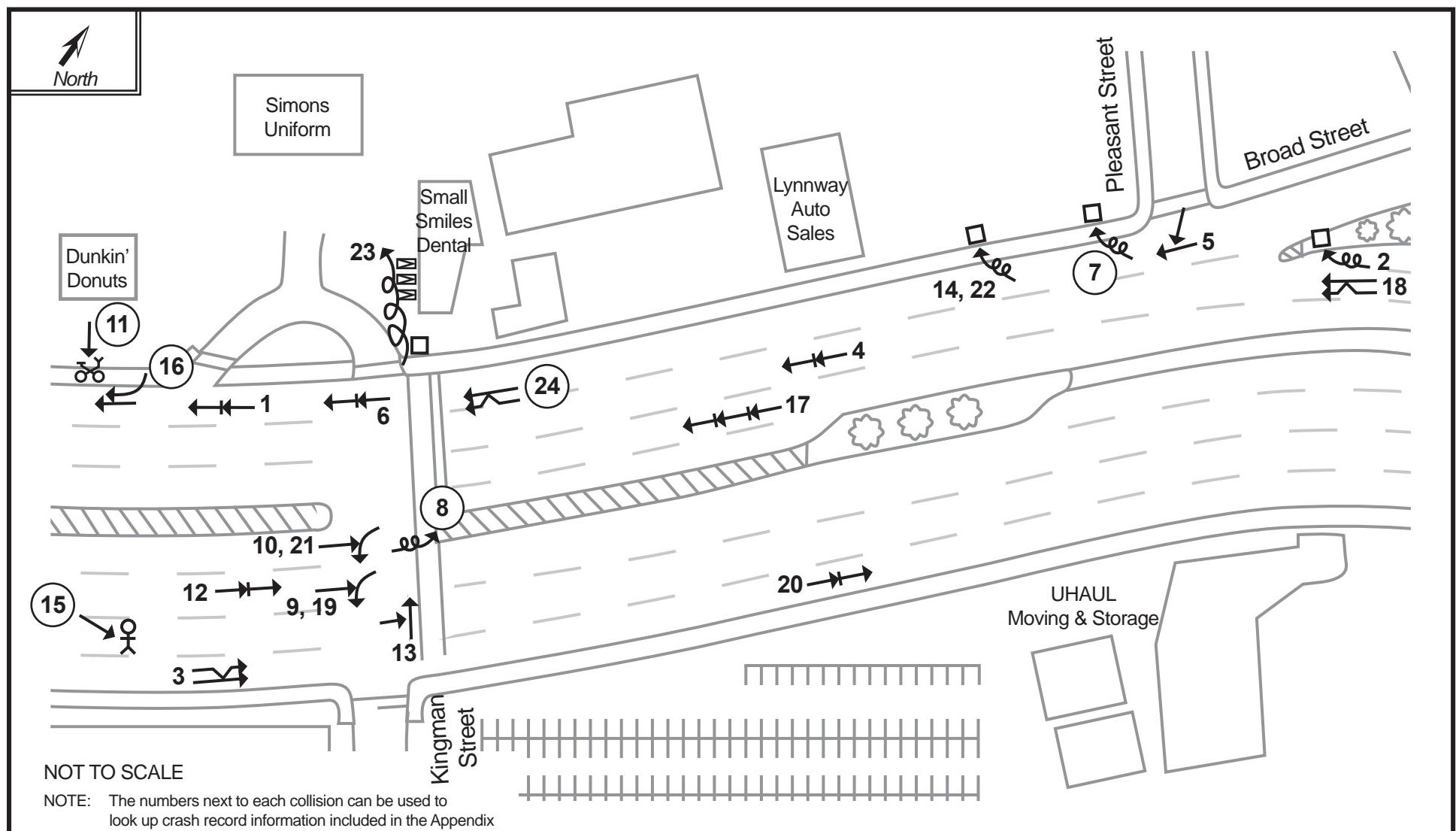
SYMBOLS	TYPES OF CRASH	SEVERITY
→ Moving Vehicle	→ Parked Vehicle	
→ Backing Vehicle	□ Fixed Object	
→ Non-Involved Vehicle	→ Bicycle	
→ Pedestrian	→ Animal	
→ Non-Involved Pedestrian		
	→ → Head On	
	→ ↙ Angle	
	→ → Rear End	
	→ ← Sideswipe	
	→ ↘ Out of Control	
		○ Injury Accident
		● Fatal Accident

Collision Diagram  
Section 4: Shepard Street

Figure Number	Final Sketch Number	Crash Number	Crash Time	Crash Date1	Crash Severity	Manner of Collision	Vehicle Traveled Direction	Road Surface Condition	Ambient Light Condition	Weather Condition	Bike or Ped
4 1	2578970	12:40 PM	22-Mar-2010	Non-fatal injury	Head-on	V1:Northbound / V2:Southbound / V3	Dry	Daylight	Cloudy		
4 2	2590577	7:28 PM	10-Apr-2010	Property damage only (n)	Single vehicle crash	V1:Northbound	Dry	Dusk	Not Reported		
4 3	2601448	7:20 AM	24-May-2010	Property damage only (n)	Rear-end	V1:Northbound / V2:Northbound	Dry	Daylight	Not Reported		
4 4	2634265	9:08 PM	25-Aug-2010	Property damage only (n)	Single vehicle crash	V1:Not reported	Wet	Dark - lighted roadway	Rain		
4 5	2658383	2:15 PM	29-Oct-2010	Non-fatal injury	Rear-end	V1:Southbound / V2:Southbound	Dry	Daylight	Not Reported		
4 6	2663637	12:20 PM	05-Nov-2010	Property damage only (n)	Angle	V1:Southbound / V2:Southbound	Dry	Daylight	Clear		
4 7	2663639	9:15 AM	10-Nov-2010	Property damage only (n)	Rear-end	V1:Southbound / V2:Southbound	Dry	Daylight	Clear		
4 8	2663811	3:20 PM	05-Nov-2010	Property damage only (n)	Single vehicle crash	V1:Northbound / V2:Northbound	Dry	Daylight	Not Reported		
4 9	2665452	5:57 AM	26-Nov-2010	Non-fatal injury	Rear-end	V1:Northbound / V2:Northbound	Water (stand)	Dark - lighted roadway	Sleet, hail (freezing rain or drizzle)		
4 10	2667084	3:30 PM	11-Nov-2010	Property damage only (n)	Angle	V1:Northbound / V2:Northbound	Dry	Daylight	Clear		
4 11	2668610	9:55 AM	01-Dec-2010	Property damage only (n)	Angle	V1:Southbound / V2:Southbound	Wet	Daylight	Cloudy		
4 12	2675113	10:15 PM	18-Dec-2010	Property damage only (n)	Sideswipe, same direction	V1:Southbound / V2:Southbound	Dry	Dark - lighted roadway	Clear		
4 13	2701727	10:10 AM	20-Feb-2011	Not Reported	Rear-end	V1:Southbound / V2:Not reported	Dry	Daylight	Clear		
4 14	2742769	2:01 PM	18-Jul-2011	Property damage only (n)	Rear-end	V1:Northbound / V2:Northbound	Wet	Daylight	Not Reported		
4 15	3248238	9:15 AM	10-Aug-2012	Property damage only (n)	Angle	V1:Westbound / V2:Northbound	Dry	Daylight	Clear		
4 16	3392231	4:53 PM	14-May-2012	Property damage only (n)	Sideswipe, same direction	V1:Southbound / V2:Southbound / V3	Wet	Daylight	Rain		

NOT TO SCALE

Figure 5  
Lynnway, Lynn, MA  
Section 6: Kingman Street



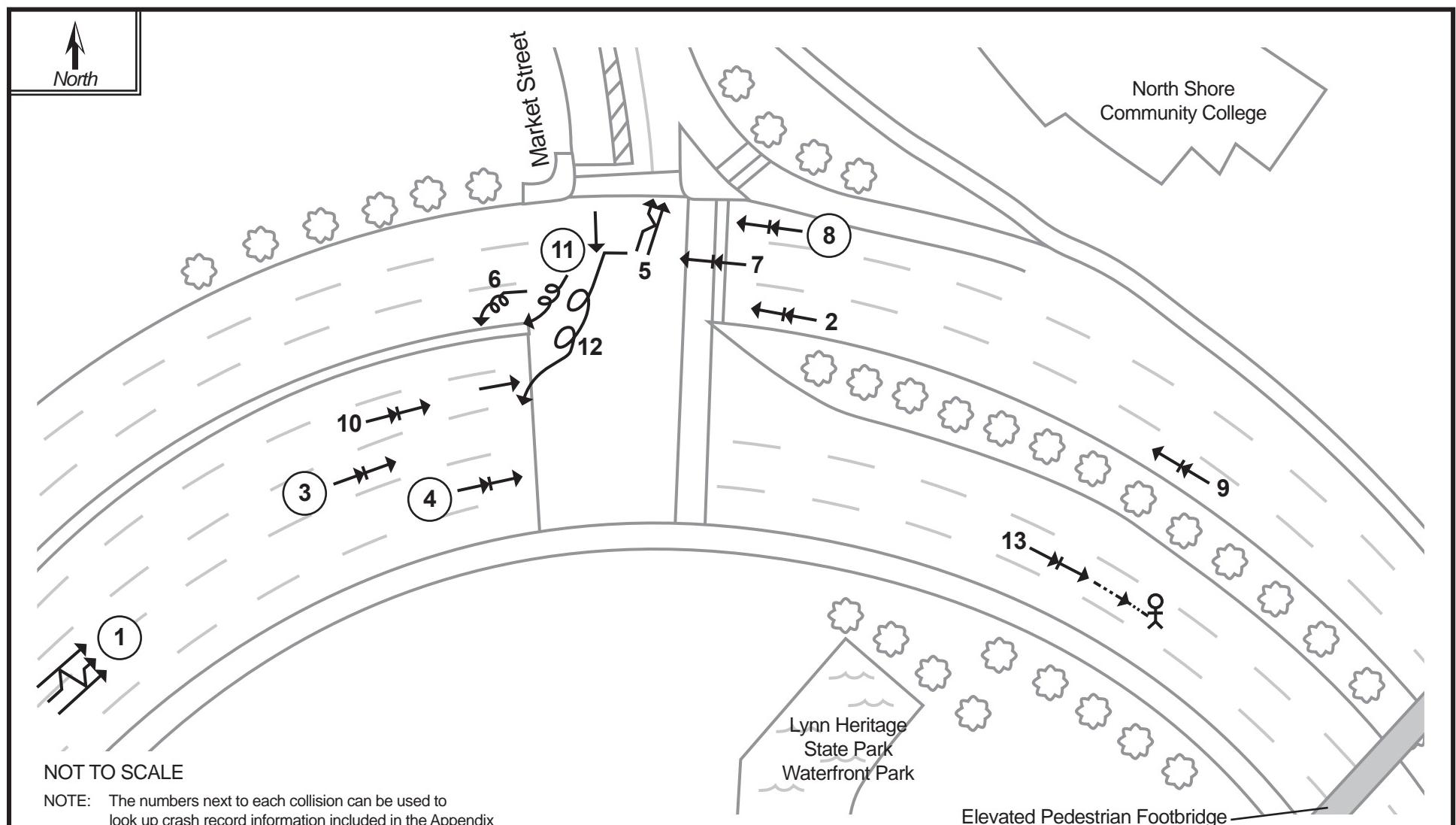
SYMBOLS	TYPES OF CRASH	SEVERITY
→ Moving Vehicle	→ Parked Vehicle	
→ Backing Vehicle	□ Fixed Object	
→ Non-Involved Vehicle	→ Bicycle	
→ Pedestrian	→ Animal	
→ Non-Involved Pedestrian		
	↔ Head On	
	↓ ↙ Angle	
	→ → Rear End	
	↔ Sideswipe	
	↔ Out of Control	
		○ Injury Accident
		● Fatal Accident

Collision Diagram  
Section 6: Kingman Street

Figure Number	Final Sketch Number	Crash Number	Crash Time	Crash Date1	Crash Severity	Manner of Collision	Vehicle Traveled Direction	Road Surface Condition	Ambient Light Condition	Weather Condition	Bike or Ped
6	1	2554563	9:30 AM	13-Jan-2010	Property damage only (n)	Rear-end	V1:Southbound / V2:Southbound	Dry	Daylight	Clear	
6	2	2579795	1:26 AM	20-Mar-2010	Property damage only (n)	Single vehicle crash	V1:Southbound	Dry	Dark - lighted roadway	Not Reported	
6	3	2592251	4:40 PM	09-Apr-2010	Property damage only (n)	Sideswipe, same direction	V1:Southbound / V2:Southbound	Wet	Daylight	Not Reported	
6	4	2617582	11:15 AM	05-Jul-2010	Not Reported	Rear-end	V1:Southbound / V2:Southbound	Dry	Daylight	Clear	
6	5	2620589	1:00 PM	23-Jun-2010	Property damage only (n)	Angle	V1:Southbound / V2:Southbound	Dry	Daylight	Not Reported	
6	6	2657774	2:45 PM	04-Nov-2010	Property damage only (n)	Rear-end	V1:Southbound / V2:Southbound	Wet	Daylight	Rain	
6	7	2666153	10:35 PM	19-Nov-2010	Non-fatal injury	Single vehicle crash	V1:Southbound	Dry	Dark - lighted roadway	Not Reported	
6	8	2667901	7:25 PM	29-Nov-2010	Non-fatal injury	Single vehicle crash	V1:Northbound	Dry	Dark - lighted roadway	Not Reported	
6	9	2689458	12:49 PM	04-Feb-2011	Property damage only (n)	Angle	V1:Northbound / V2:Eastbound	Dry	Daylight	Clear	
6	10	2700900	2:22 PM	14-Feb-2011	Property damage only (n)	Angle	V1:Eastbound / V2:Northbound	Dry	Daylight	Clear	
6	11	2737363	7:50 AM	01-Jul-2011	Non-fatal injury	Not reported	V1:Southbound	Dry	Daylight	Not Reported	cyc
6	12	2765133	9:35 AM	15-Sep-2011	Property damage only (n)	Rear-end	V1:Northbound / V2:Northbound	Dry	Daylight	Cloudy	
6	13	2898288	9:35 AM	27-Jan-2012	Property damage only (n)	Angle	V1:Westbound / V2:Northbound	Wet	Daylight	Rain	
6	14	3241472	9:15 AM	03-Aug-2012	Property damage only (n)	Single vehicle crash	V1:Southbound	Dry	Daylight	Clear	
6	15	3244479	8:39 PM	16-Aug-2012	Non-fatal injury	Single vehicle crash	V1:Northbound	Dry	Dark - lighted roadway	Clear	ped
6	16	3250915	9:45 AM	02-Sep-2012	Non-fatal injury	Angle	V1:Northbound / V2:Northbound	Dry	Daylight	Clear	
6	17	3265566	9:40 AM	24-Sep-2012	Property damage only (n)	Rear-end	V1:Southbound / V2:Southbound / V3	Dry	Daylight	Clear	
6	18	3291213	4:40 PM	24-Oct-2012	Property damage only (n)	Sideswipe, same direction	V1:Southbound / V2:Southbound	Dry	Daylight	Clear	
6	19	3321345	9:30 AM	10-Dec-2012	Property damage only (n)	Angle	V1:Northbound / V2:Eastbound	Dry	Daylight	Clear	
6	20	3372601	5:25 PM	12-Sep-2011	Property damage only (n)	Rear-end	V1:Northbound / V2:Northbound	Dry	Daylight	Not Reported	
6	21	3372617	1:04 PM	06-Nov-2011	Property damage only (n)	Angle	V1:Eastbound / V2:Northbound	Dry	Daylight	Clear	
6	22	3372651	3:38 AM	29-Oct-2011	Property damage only (n)	Single vehicle crash	V1:Southbound	Dry	Dark - lighted roadway	Clear	
6	23	3379080	4:18 PM	24-Sep-2012	Property damage only (n)	Angle	V1:Westbound / V2:Not reported / V3	Dry	Daylight	Not Reported	
6	24	3379087	9:48 AM	31-Oct-2012	Non-fatal injury	Sideswipe, same direction	V1:Southbound / V2:Southbound	Dry	Daylight	Cloudy	

NOT TO SCALE

Figure 6  
Lynnway, Lynn, MA  
Section 7: Market Street

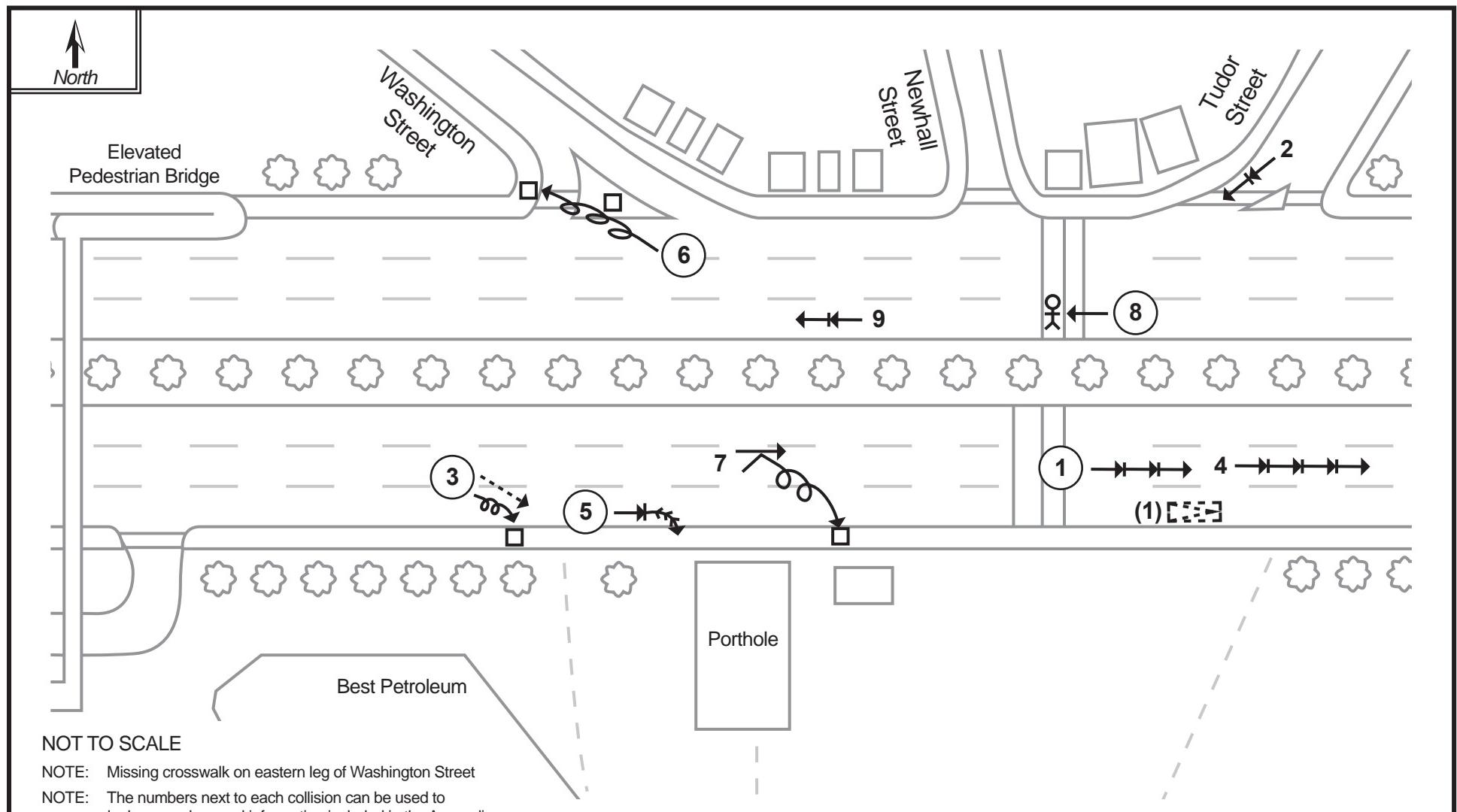


SYMBOLS	TYPES OF CRASH	SEVERITY
<ul style="list-style-type: none"><li>→ Moving Vehicle</li><li>→ Backing Vehicle</li><li>→ Non-Involved Vehicle</li><li>→ Pedestrian</li><li>→ Non-Involved Pedestrian</li></ul>	<ul style="list-style-type: none"><li>→ Parked Vehicle</li><li>→ Fixed Object</li><li>→ Bicycle</li><li>→ Animal</li></ul> <ul style="list-style-type: none"><li>↔ Head On</li><li>↓ ↙ Angle</li><li>→ → Rear End</li></ul>	<ul style="list-style-type: none"><li>○ Injury Accident</li><li>● Fatal Accident</li></ul>

Collision Diagram  
Section 7: Market Street

Figure Number	Final Sketch Number	Crash Number	Crash Time	Crash Date1	Crash Severity	Manner of Collision	Vehicle Traveled Direction	Road Surface Condition	Ambient Light Condition	Weather Condition	Bike or Ped
7 1	2603095	6:00 PM	22-May-2010	Non-fatal injury	Sideswipe, same direction	V1:Eastbound / V2:Eastbound / V3:Ea	Dry	Daylight	Not Reported		
7 2	2630861	9:32 AM	28-Jul-2010	Property damage only (n)	Rear-end	V1:Southbound / V2:Southbound	Dry	Daylight	Clear		
7 3	2657966	5:47 PM	07-Nov-2010	Non-fatal injury	Rear-end	V1:Northbound / V2:Northbound / V3:Nb	Dry	Dark - lighted roadway	Not Reported		
7 4	2669912	1:51 PM	09-Dec-2010	Non-fatal injury	Rear-end	V1:Northbound / V2:Northbound	Dry	Daylight	Not Reported		
7 5	2793850	1:05 PM	09-Nov-2011	Property damage only (n)	Sideswipe, same direction	V1:Northbound / V2:Northbound	Dry	Daylight	Not Reported		
7 6	3117824	4:49 AM	28-May-2012	Not Reported	Single vehicle crash	V1:Southbound	Dry	Dawn	Clear		
7 X	3156154	10:30 PM	29-Nov-2011	Property damage only (n)	Not reported	V1:Southbound / V2:Not reported	Dry	Dark - lighted roadway	Clear		
7 7	3162956	3:46 PM	12-Feb-2012	Property damage only (n)	Rear-end	V1:Southbound / V2:Southbound	Dry	Dusk	Clear		
7 8	3263161	7:30 AM	04-Sep-2012	Non-fatal injury	Rear-end	V1:Southbound / V2:Southbound	Wet	Daylight	Cloudy		
7 9	3301801	8:05 AM	03-Dec-2012	Property damage only (n)	Rear-end	V1:Southbound / V2:Southbound	Dry	Daylight	Clear		
7 10	3332184	6:44 PM	29-Dec-2012	Property damage only (n)	Rear-end	V1:Northbound / V2:Northbound	Ice	Dark - lighted roadway	Not Reported		
7 11	3372657	8:10 PM	24-Nov-2011	Non-fatal injury	Single vehicle crash	V1:Southbound	Dry	Dark - lighted roadway	Clear		
7 12	3373325	8:44 AM	17-Oct-2011	Property damage only (n)	Angle	V1:Northbound / V2:Southbound / V3:Sb	Dry	Daylight	Not Reported		
7 13	3376932	8:40 PM	25-Jul-2012	Property damage only (n)	Rear-end	V1:Northbound / V2:Northbound	Dry	Dark - roadway not lighted	Not Reported		

**Figure 7**  
**Lynnway, Lynn, MA**  
**Section 7A: Washington Street, Newhall Street, and Tudor Street**



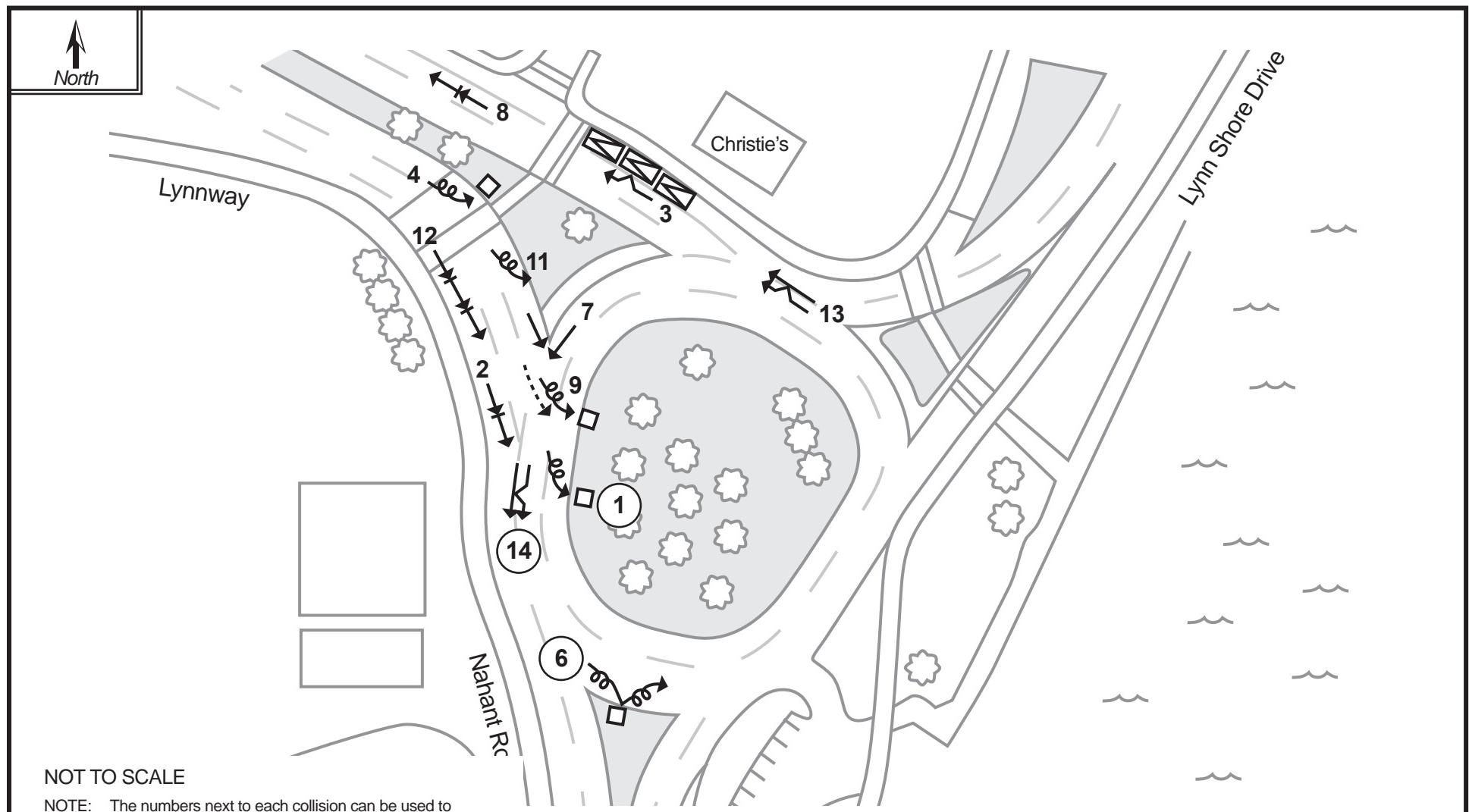
SYMBOLS	TYPES OF CRASH	SEVERITY
→ Moving Vehicle	→ Parked Vehicle	
→ Backing Vehicle	→ Fixed Object	
→ Non-Involved Vehicle	→ Bicycle	
→ Pedestrian	→ Animal	
→ Non-Involved Pedestrian		
	↔ Head On	
	↓ ↙ Angle	
	→ Rear End	
	↔ Sideswipe	
	↔ Out of Control	
		○ Injury Accident
		● Fatal Accident

Collision Diagram  
Section 7A: Washington Street

Figure Number	Final Sketch Number	Crash Number	Crash Time	Crash Date1	Crash Severity	Manner of Collision	Vehicle Traveled Direction	Road Surface Condition	Ambient Light Condition	Weather Condition	Bike or Ped
7A 1	2578968	6:08 PM	18-Mar-2010	Non-fatal injury	Rear-end	V1:Northbound / V2:Northbound / V3:	Dry	Daylight	Not Reported		
7A 2	2580981	8:05 AM	29-Mar-2010	Property damage only (n)	Rear-end	V1:Southbound / V2:Southbound	Wet	Daylight	Rain		
7A 3	2635079	12:25 PM	31-Aug-2010	Non-fatal injury	Angle	V1:Northbound / V2:Northbound	Dry	Daylight	Clear		
7A 4	2765034	6:14 PM	06-Sep-2011	Property damage only (n)	Rear-end	V1:Northbound / V2:Northbound / V3:	Wet	Daylight	Rain		
7A 5	2791147	11:57 PM	15-Oct-2011	Non-fatal injury	Rear-end	V1:Northbound / V2:Northbound	Dry	Dark - lighted roadway	Not Reported		
7A 6	3004246	6:45 AM	02-Apr-2012	Non-fatal injury	Single vehicle crash	V1:Westbound	Dry	Daylight	Cloudy		
7A 7	3109858	3:20 PM	22-May-2012	Not Reported	Angle	V1:Northbound / V2:Northbound	Wet	Daylight	Not Reported		
7A 8	3179571	9:26 PM	29-Jun-2012	Non-fatal injury	Single vehicle crash	V1:Southbound	Dry	Dark - lighted roadway	Clear	ped	
7A 9	3280748	11:31 AM	12-Oct-2012	Property damage only (n)	Rear-end	V1:Southbound / V2:Southbound	Wet	Daylight	Cloudy/Rain		

NOT TO SCALE

Figure 8  
Lynnway, Lynn, MA  
Section 8: Nahant Rotary



NOT TO SCALE

NOTE: The numbers next to each collision can be used to look up crash record information included in the Appendix

SYMBOLS	TYPES OF CRASH	SEVERITY
→ Moving Vehicle	→ Parked Vehicle	
→ Backing Vehicle	→ Fixed Object	
→ Non-Involved Vehicle	→ Bicycle	
→ Pedestrian	→ Animal	
→ Non-Involved Pedestrian		
	→ → Head On	
	→ ↘ Angle	
	→ → Rear End	
	→ ↗ Sideswipe	
	→ ↙ Out of Control	
		○ Injury Accident
		● Fatal Accident

Collision Diagram  
Section 8: Nahant Rotary

Figure Number	Final Sketch Number	Crash Number	Crash Time	Crash Date1	Crash Severity	Manner of Collision	Vehicle Traveled Direction	Road Surface Condition	Ambient Light Condition	Weather Condition	Bike or Ped
8 1	2590581	00:00 AM	18-Apr-2010	Non-fatal injury	Single vehicle crash	V1:Eastbound	Wet	Dark - lighted roadway	Not Reported		
8 2	2592234	6:08 PM	22-Mar-2010	Property damage only (n)	Rear-end	V1:Eastbound / V2:Not reported	Dry	Daylight	Not Reported		
8 3	2656735	1:47 AM	30-Oct-2010	Property damage only (n)	Sideswipe, same direction	V1:Southbound / V2:Not reported / V3:Not reported	Dry	Dark - lighted roadway	Not Reported		
8 4	2667080	5:43 AM	07-Nov-2010	Property damage only (n)	Single vehicle crash	V1:Northbound	Dry	Daylight	Cloudy		
8 5	2675183	00:00 AM	24-Dec-2010	Property damage only (n)	Single vehicle crash	V1:Northbound	Dry	Dark - lighted roadway	Not Reported		
8 6	2683978	11:31 PM	19-Jan-2011	Non-fatal injury	Single vehicle crash	V1:Northbound	Wet	Dark - lighted roadway	Cloudy/Snow		
8 7	2713520	6:20 PM	09-Apr-2011	Property damage only (n)	Angle	V1:Eastbound / V2:Southbound	Dry	Daylight	Clear		
8 8	2716708	8:00 AM	14-Apr-2011	Property damage only (n)	Rear-end	V1:Westbound / V2:Westbound	Dry	Daylight	Cloudy		
8 9	2720788	3:51 AM	01-May-2011	Property damage only (n)	Single vehicle crash	V1:Northbound	Dry	Dark - lighted roadway	Clear		
8 10	2754783	8:05 AM	27-Aug-2011	Not Reported	Single vehicle crash	V1:Northbound	Dry	Daylight	Clear		
8 11	2844102	1:15 AM	23-Dec-2011	Not Reported	Single vehicle crash	V1:Northbound	Wet	Dark - lighted roadway	Cloudy/Rain		
8 12	2864362	6:55 PM	12-Jan-2012	Property damage only (n)	Rear-end	V1:Northbound / V2:Northbound / V3:Not reported	Dry	Dark - lighted roadway	Clear		
8 13	3153148	1:25 PM	20-Jun-2012	Property damage only (n)	Sideswipe, same direction	V1:Southbound / V2:Southbound	Dry	Daylight	Clear		
8 14	3246217	5:15 PM	14-Aug-2012	Non-fatal injury	Sideswipe, same direction	V1:Southbound / V2:Southbound	Dry	Daylight	Clear		

# **APPENDIX H**

## **Level of Service (LOS) Analysis Existing Conditions**





Lane Group	WBL	WBR	NBT	NBR	SBL	SBT
Lane Configurations	↑ ↘	↑ ↗	↑↑↑ ↗		↑ ↘	↑↑↑
Traffic Volume (vph)	20	15	925	35	150	2210
Future Volume (vph)	20	15	925	35	150	2210
Satd. Flow (prot)	1678	1501	4797	0	1678	4821
Flt Permitted	0.950				0.950	
Satd. Flow (perm)	1678	1501	4797	0	1678	4821
Satd. Flow (RTOR)			16	6		
Lane Group Flow (vph)	21	16	1000	0	156	2302
Turn Type	Prot	Perm	NA		Prot	NA
Protected Phases	8		2		1	6
Permitted Phases			8			
Total Split (s)	35.0	35.0	58.0		27.0	85.0
Total Lost Time (s)	4.0	4.0	4.0		4.0	4.0
Act Efect Green (s)	12.8	12.8	82.8		17.3	105.6
Actuated g/C Ratio	0.11	0.11	0.69		0.14	0.88
v/c Ratio	0.12	0.09	0.30		0.65	0.54
Control Delay	45.5	18.1	9.9		63.7	1.2
Queue Delay	0.0	0.0	0.0		0.0	0.0
Total Delay	45.5	18.1	9.9		63.7	1.2
LOS	D	B	A		E	A
Approach Delay	33.6			9.9		5.2
Approach LOS	C			A		A
Queue Length 50th (ft)	16	0	100		111	0
Queue Length 95th (ft)	33	18	231		178	198
Internal Link Dist (ft)	376		617			1043
Turn Bay Length (ft)				400		
Base Capacity (vph)	433	399	3310		321	4244
Starvation Cap Reductn	0	0	0		0	0
Spillback Cap Reductn	0	0	0		0	0
Storage Cap Reductn	0	0	0		0	0
Reduced v/c Ratio	0.05	0.04	0.30		0.49	0.54

#### Intersection Summary

Cycle Length: 120

Actuated Cycle Length: 120

Offset: 0 (0%), Referenced to phase 2:NBT and 6:SBT, Start of Green, Master Intersection

Control Type: Actuated-Coordinated

Maximum v/c Ratio: 0.65

Intersection Signal Delay: 6.8

Intersection LOS: A

Intersection Capacity Utilization 55.2%

ICU Level of Service B

Analysis Period (min) 15

Splits and Phases: 2: Lynnway & Hanson St



Lane Group	NBL	NBT	NBR	SBL	SBT	SBR	NEL	NET	NER	SWL	SWT	SWR
Lane Configurations	↑	↑			↑	↑	↑	↑↑↑		↑	↑↑↑	
Traffic Volume (vph)	25	0	5	5	0	5	25	900	20	70	2335	15
Future Volume (vph)	25	0	5	5	0	5	25	900	20	70	2335	15
Satd. Flow (prot)	1678	1501	0	0	1678	1501	1678	4807	0	1678	4816	0
Flt Permitted	0.754				0.754		0.950			0.950		
Satd. Flow (perm)	1332	1501	0	0	1332	1501	1678	4807	0	1678	4816	0
Satd. Flow (RTOR)		310				109		4			1	
Lane Group Flow (vph)	26	5	0	0	5	5	26	959	0	73	2448	0
Turn Type	Perm	NA		Perm	NA	Perm	Prot	NA		Prot	NA	
Protected Phases		8			4		5	2		1	6	
Permitted Phases	8				4		4					
Total Split (s)	30.0	30.0		30.0	30.0	30.0	20.0	70.0		20.0	70.0	
Total Lost Time (s)	4.0	4.0			4.0	4.0	4.0	4.0		4.0	4.0	
Act Efect Green (s)	9.9	9.9			9.7	9.7	12.8	94.4		11.7	96.5	
Actuated g/C Ratio	0.08	0.08			0.08	0.08	0.11	0.79		0.10	0.80	
v/c Ratio	0.24	0.01			0.05	0.02	0.15	0.25		0.45	0.63	
Control Delay	55.8	0.0			50.0	0.2	42.3	6.6		63.2	3.2	
Queue Delay	0.0	0.0			0.0	0.0	0.0	0.0		0.0	0.0	
Total Delay	55.8	0.0			50.0	0.2	42.3	6.6		63.2	3.2	
LOS	E	A			D	A	D	A		E	A	
Approach Delay		46.8			25.1			7.5			5.0	
Approach LOS		D			C			A			A	
Queue Length 50th (ft)	19	0			4	0	18	83		58	122	
Queue Length 95th (ft)	48	0			16	0	24	149		m67	160	
Internal Link Dist (ft)		148			94			1043			1847	
Turn Bay Length (ft)							300			300		
Base Capacity (vph)	288	568			288	410	223	3781		223	3871	
Starvation Cap Reductn	0	0			0	0	0	0		0	0	
Spillback Cap Reductn	0	0			0	0	0	0		0	0	
Storage Cap Reductn	0	0			0	0	0	0		0	0	
Reduced v/c Ratio	0.09	0.01			0.02	0.01	0.12	0.25		0.33	0.63	

#### Intersection Summary

Cycle Length: 120

Actuated Cycle Length: 120

Offset: 93 (78%), Referenced to phase 2:NET and 6:SWT, Start of Green

Control Type: Actuated-Coordinated

Maximum v/c Ratio: 0.63

Intersection Signal Delay: 6.1

Intersection LOS: A

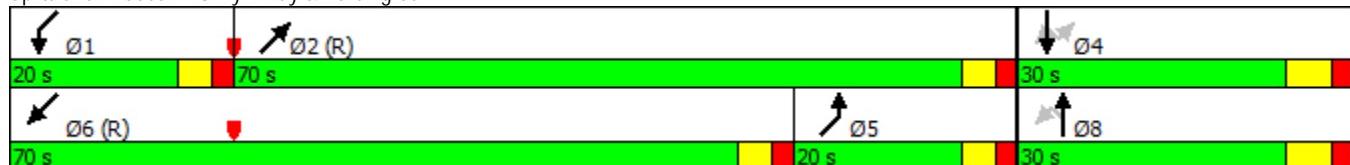
Intersection Capacity Utilization 69.3%

ICU Level of Service C

Analysis Period (min) 15

m Volume for 95th percentile queue is metered by upstream signal.

Splits and Phases: 3: Lynnway & Harding St



Lane Group	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations	↑	↑↑↑			↑↑↑	↑				↑	↑	↑
Traffic Volume (vph)	260	765	10	0	1990	275	0	0	0	245	95	535
Future Volume (vph)	260	765	10	0	1990	275	0	0	0	245	95	535
Satd. Flow (prot)	1678	4812	0	0	4821	1501	0	0	0	1678	1766	1501
Flt Permitted	0.950									0.950		
Satd. Flow (perm)	1678	4812	0	0	4821	1501	0	0	0	1678	1766	1501
Satd. Flow (RTOR)			4			276						9
Lane Group Flow (vph)	271	807	0	0	2073	286	0	0	0	255	99	557
Turn Type	Prot	NA			NA	Perm				Perm	NA	pt+ov
Protected Phases	5	2			6					4	4	5
Permitted Phases					6					4		
Total Split (s)	30.0	90.0			60.0	60.0				30.0	30.0	
Total Lost Time (s)	4.0	4.0			4.0	4.0				4.0	4.0	
Act Efect Green (s)	26.0	88.7			58.7	58.7				23.3	23.3	53.3
Actuated g/C Ratio	0.22	0.74			0.49	0.49				0.19	0.19	0.44
v/c Ratio	0.75	0.23			0.88	0.33				0.78	0.29	0.83
Control Delay	59.1	5.6			45.7	11.9				63.0	42.7	40.6
Queue Delay	0.0	0.0			0.0	0.0				0.0	0.0	0.0
Total Delay	59.1	5.6			45.7	11.9				63.0	42.7	40.6
LOS	E	A			D	B				E	D	D
Approach Delay		19.0			41.6						47.1	
Approach LOS		B			D						D	
Queue Length 50th (ft)	222	113			631	103				184	64	351
Queue Length 95th (ft)	#324	9			681	143				279	115	511
Internal Link Dist (ft)		1847			1063			493			489	
Turn Bay Length (ft)	600					300				200		200
Base Capacity (vph)	363	3559			2359	875				363	382	705
Starvation Cap Reductn	0	0			0	0				0	0	0
Spillback Cap Reductn	0	0			0	0				0	0	0
Storage Cap Reductn	0	0			0	0				0	0	0
Reduced v/c Ratio	0.75	0.23			0.88	0.33				0.70	0.26	0.79

#### Intersection Summary

Cycle Length: 120

Actuated Cycle Length: 120

Offset: 49 (41%), Referenced to phase 2:EBT and 6:WBT, Start of Green

Control Type: Actuated-Coordinated

Maximum v/c Ratio: 0.88

Intersection Signal Delay: 37.2

Intersection LOS: D

Intersection Capacity Utilization 78.2%

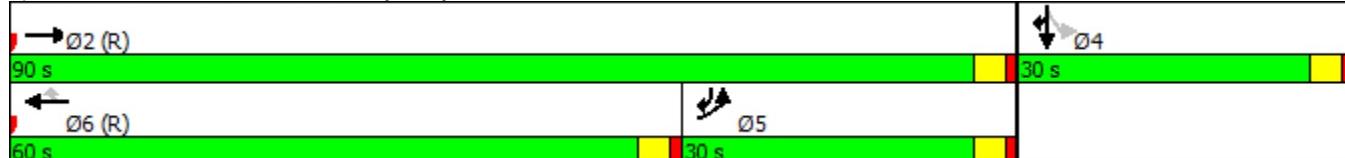
ICU Level of Service D

Analysis Period (min) 15

# 95th percentile volume exceeds capacity, queue may be longer.

Queue shown is maximum after two cycles.

Splits and Phases: 4: Commercial St & Lynnway



Lane Group	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations	↑	↑↑↑		↑	↑↑↑		↑	↑			↔	
Traffic Volume (vph)	50	955	20	70	2215	45	10	0	5	35	10	15
Future Volume (vph)	50	955	20	70	2215	45	10	0	5	35	10	15
Satd. Flow (prot)	1678	4807	0	1678	4807	0	1678	1501	0	0	1656	0
Flt Permitted	0.950				0.950			0.719				0.818
Satd. Flow (perm)	1678	4807	0	1678	4807	0	1270	1501	0	0	1394	0
Satd. Flow (RTOR)		5			4			302			12	
Lane Group Flow (vph)	52	1016	0	73	2354	0	10	5	0	0	62	0
Turn Type	Prot	NA		Prot	NA		Perm	NA		Perm	NA	
Protected Phases	5	2		1	6			8			4	
Permitted Phases							8				4	
Total Split (s)	20.0	77.0		20.0	77.0		23.0	23.0		23.0	23.0	
Total Lost Time (s)	4.0	4.0		4.0	4.0		4.0	4.0			4.0	
Act Efect Green (s)	10.1	86.8		14.4	90.9		12.6	12.6			12.6	
Actuated g/C Ratio	0.08	0.72		0.12	0.76		0.10	0.10			0.10	
v/c Ratio	0.37	0.29		0.36	0.65		0.08	0.01			0.40	
Control Delay	40.8	10.1		40.7	2.4		47.1	0.0			47.4	
Queue Delay	0.0	0.0		0.0	0.0		0.0	0.0			0.0	
Total Delay	40.8	10.1		40.7	2.4		47.1	0.0			47.4	
LOS	D	B		D	A		D	A			D	
Approach Delay		11.6			3.5			31.4			47.4	
Approach LOS		B			A			C			D	
Queue Length 50th (ft)	27	205		57	35		7	0			37	
Queue Length 95th (ft)	m55	180		m71	67		23	0			77	
Internal Link Dist (ft)		1063			584			95			161	
Turn Bay Length (ft)	250			400								
Base Capacity (vph)	223	3480		223	3640		201	491			230	
Starvation Cap Reductn	0	0		0	0		0	0			0	
Spillback Cap Reductn	0	0		0	0		0	0			0	
Storage Cap Reductn	0	0		0	0		0	0			0	
Reduced v/c Ratio	0.23	0.29		0.33	0.65		0.05	0.01			0.27	

#### Intersection Summary

Cycle Length: 120

Actuated Cycle Length: 120

Offset: 103 (86%), Referenced to phase 2:EBT and 6:WBT, Start of Green

Control Type: Actuated-Coordinated

Maximum v/c Ratio: 0.65

Intersection Signal Delay: 6.8

Intersection LOS: A

Intersection Capacity Utilization 68.0%

ICU Level of Service C

Analysis Period (min) 15

m Volume for 95th percentile queue is metered by upstream signal.

Splits and Phases: 5: Marine Blvd/Sheppard St & Lynnway



Lane Group	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations	↑	↑↑↑		↑	↑↑↑		↑	↑				
Traffic Volume (vph)	55	975	40	95	2240	150	45	5	50	0	0	0
Future Volume (vph)	55	975	40	95	2240	150	45	5	50	0	0	0
Satd. Flow (prot)	1678	4792	0	1678	4778	0	1678	1524	0	0	0	0
Flt Permitted	0.950			0.950			0.950					
Satd. Flow (perm)	1678	4792	0	1678	4778	0	1678	1524	0	0	0	0
Satd. Flow (RTOR)		8			14			52				
Lane Group Flow (vph)	57	1058	0	99	2489	0	47	57	0	0	0	0
Turn Type	Prot	NA		Prot	NA		Split	NA				
Protected Phases	5	2		1	6		8	8				
Permitted Phases												
Total Split (s)	20.0	70.0		20.0	70.0		30.0	30.0				
Total Lost Time (s)	4.0	4.0		4.0	4.0		4.0	4.0				
Act Efect Green (s)	9.7	86.6		12.4	92.3		10.9	10.9				
Actuated g/C Ratio	0.08	0.72		0.10	0.77		0.09	0.09				
v/c Ratio	0.42	0.31		0.58	0.68		0.31	0.31				
Control Delay	65.2	6.6		79.8	7.7		53.5	18.3				
Queue Delay	0.0	0.0		0.0	0.0		0.0	0.0				
Total Delay	65.2	6.6		79.8	7.7		53.5	18.3				
LOS	E	A		E	A		D	B				
Approach Delay		9.6			10.5			34.2				
Approach LOS		A			B			C				
Queue Length 50th (ft)	47	72		80	73		35	4				
Queue Length 95th (ft)	92	127		m110	767		66	40				
Internal Link Dist (ft)		494			544			142				85
Turn Bay Length (ft)				300								
Base Capacity (vph)	223	3461		226	3678		363	370				
Starvation Cap Reductn	0	0		0	0		0	0				
Spillback Cap Reductn	0	0		0	0		0	0				
Storage Cap Reductn	0	0		0	0		0	0				
Reduced v/c Ratio	0.26	0.31		0.44	0.68		0.13	0.15				

#### Intersection Summary

Cycle Length: 120

Actuated Cycle Length: 120

Offset: 90 (75%), Referenced to phase 2:EBT and 6:WBT, Start of Green

Control Type: Actuated-Coordinated

Maximum v/c Ratio: 0.68

Intersection Signal Delay: 10.9

Intersection LOS: B

Intersection Capacity Utilization 65.8%

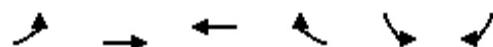
ICU Level of Service C

Analysis Period (min) 15

m Volume for 95th percentile queue is metered by upstream signal.

Splits and Phases: 6: Kingman St & Lynnway





Lane Group	EBL	EBT	WBT	WBR	SBL	SBR
Lane Configurations	↑↑	↑↑↑	↑↑↑	↑	↑↑	
Traffic Volume (vph)	425	600	1515	200	160	25
Future Volume (vph)	425	600	1515	200	160	25
Satd. Flow (prot)	3255	4821	4821	1501	3220	0
Flt Permitted	0.950				0.959	
Satd. Flow (perm)	3255	4821	4821	1501	3220	0
Satd. Flow (RTOR)				208	15	
Lane Group Flow (vph)	443	625	1578	208	193	0
Turn Type	Prot	NA	NA	Perm	Prot	
Protected Phases	5	2	6		7	
Permitted Phases				6		
Total Split (s)	50.0	80.0	30.0	30.0	40.0	
Total Lost Time (s)	4.0	4.0	4.0	4.0	4.0	
Act Efct Green (s)	46.0	100.0	50.0	50.0	12.0	
Actuated g/C Ratio	0.38	0.83	0.42	0.42	0.10	
v/c Ratio	0.36	0.16	0.79	0.28	0.57	
Control Delay	11.8	0.9	34.3	4.2	50.6	
Queue Delay	0.0	0.0	0.0	0.0	0.0	
Total Delay	11.8	0.9	34.3	4.2	50.6	
LOS	B	A	C	A	D	
Approach Delay		5.4	30.8		50.6	
Approach LOS		A	C		D	
Queue Length 50th (ft)	78	5	382	0	71	
Queue Length 95th (ft)	19	8	469	48	108	
Internal Link Dist (ft)		431	1038		315	
Turn Bay Length (ft)			600			
Base Capacity (vph)	1247	4016	2008	746	976	
Starvation Cap Reductn	0	0	0	0	0	
Spillback Cap Reductn	0	0	0	0	0	
Storage Cap Reductn	0	0	0	0	0	
Reduced v/c Ratio	0.36	0.16	0.79	0.28	0.20	

#### Intersection Summary

Cycle Length: 120

Actuated Cycle Length: 120

Offset: 80 (67%), Referenced to phase 2:EBT and 6:WBT, Start of Green

Control Type: Actuated-Coordinated

Maximum v/c Ratio: 0.79

Intersection Signal Delay: 23.1

Intersection LOS: C

Intersection Capacity Utilization 57.2%

ICU Level of Service B

Analysis Period (min) 15

Splits and Phases: 7: Lynnway/Carroll Parkway & Market St



	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Traffic Volume (vph)	0	0	0	53	500	180	10	305	310	155	135	160
Future Volume (vph)	0	0	0	53	500	180	10	305	310	155	135	160
Satd. Flow (prot)	0	0	0	0	3339	1501	0	3349	1501	0	3124	0
Flt Permitted						0.995			0.939			0.706
Satd. Flow (perm)	0	0	0	0	3339	1501	0	3151	1501	0	2243	0
Satd. Flow (RTOR)						188			323			102
Lane Group Flow (vph)	0	0	0	0	576	188	0	328	323	0	469	0
Turn Type					Split	NA	Perm	Perm	NA	pt+ov	Perm	NA
Protected Phases					3	3			2	2 3		6
Permitted Phases							3	2				6
Total Split (s)					43.0	43.0	50.0	50.0		50.0		50.0
Total Lost Time (s)						4.0	4.0		4.0			4.0
Act Efect Green (s)						30.0	30.0		65.8	101.4		65.8
Actuated g/C Ratio						0.25	0.25		0.55	0.84		0.55
v/c Ratio						0.69	0.36		0.19	0.25		0.37
Control Delay						41.8	12.6		9.0	2.1		16.3
Queue Delay						0.0	0.0		0.0	0.3		0.0
Total Delay						41.8	12.6		9.0	2.4		16.3
LOS						D	B		A	A		B
Approach Delay						34.6			5.7			16.3
Approach LOS						C			A			B
Queue Length 50th (ft)						203	15		45	0		97
Queue Length 95th (ft)						256	112		98	84		163
Internal Link Dist (ft)		27				626			315			249
Turn Bay Length (ft)							150					
Base Capacity (vph)						1085	614		1727	1347		1275
Starvation Cap Reductn						0	0		0	558		0
Spillback Cap Reductn						0	0		0	0		0
Storage Cap Reductn						0	0		0	0		0
Reduced v/c Ratio						0.53	0.31		0.19	0.41		0.37

#### Intersection Summary

Cycle Length: 120

Actuated Cycle Length: 120

Offset: 12 (10%), Referenced to phase 2:NBT and 6:SBTL, Start of Green

Control Type: Actuated-Coordinated

Maximum v/c Ratio: 0.69

Intersection Signal Delay: 20.1

Intersection LOS: C

Intersection Capacity Utilization 47.5%

ICU Level of Service A

Analysis Period (min) 15

Splits and Phases: 9: Market St & Broad St



Lane Group	EBL	EBT	EBR	WBL	WBT	WBR2	NBL2	NBL	NBT	NBR	SBL	SBT
Lane Configurations												
Traffic Volume (vph)	50	220	205	35	580	30	100	0	70	15	20	20
Future Volume (vph)	50	220	205	35	580	30	100	0	70	15	20	20
Satd. Flow (prot)	0	1750	1501	0	3322	0	0	1678	1718	0	0	1660
Flt Permitted		0.806			0.921			0.702				0.880
Satd. Flow (perm)	0	1423	1501	0	3069	0	0	1240	1718	0	0	1484
Satd. Flow (RTOR)			214		136				8			
Lane Group Flow (vph)	0	281	214	0	671	0	0	104	89	0	0	63
Turn Type	Perm	NA	Perm	Perm	NA		Perm	Perm	NA		custom	NA
Protected Phases		2			6				8			
Permitted Phases	2		2	6				8	8		4	4
Total Split (s)	50.0	50.0	50.0	50.0	50.0			24.0	24.0		24.0	24.0
Total Lost Time (s)		4.0	4.0		4.0			4.0	4.0			4.0
Act Efect Green (s)	75.5	75.5		75.5				15.5	15.5			15.5
Actuated g/C Ratio	0.63	0.63		0.63				0.13	0.13			0.13
v/c Ratio	0.31	0.21		0.34				0.65	0.39			0.33
Control Delay	6.1	0.5		11.2				67.5	47.3			50.7
Queue Delay	0.0	0.0		0.0				0.0	0.0			0.0
Total Delay	6.1	0.5		11.2				67.5	47.3			50.7
LOS	A	A		B				E	D			D
Approach Delay	3.7			11.2					58.2			50.7
Approach LOS	A			B					E			D
Queue Length 50th (ft)	29	0		82				77	58			45
Queue Length 95th (ft)	77	0		220				134	107			87
Internal Link Dist (ft)	626			404					1111			214
Turn Bay Length (ft)								150				
Base Capacity (vph)	894	1023		1980				206	293			247
Starvation Cap Reductn	0	0		0				0	0			0
Spillback Cap Reductn	0	0		0				0	0			0
Storage Cap Reductn	0	0		0				0	0			0
Reduced v/c Ratio	0.31	0.21		0.34				0.50	0.30			0.26

#### Intersection Summary

Cycle Length: 120

Actuated Cycle Length: 120

Offset: 12 (10%), Referenced to phase 2:EBTL and 6:WBT, Start of Green

Control Type: Actuated-Coordinated

Maximum v/c Ratio: 0.65

Intersection Signal Delay: 18.4

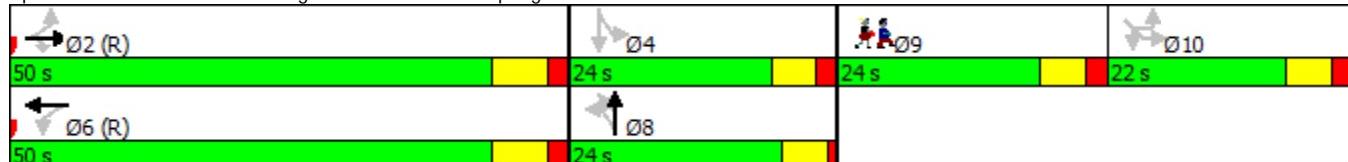
Intersection LOS: B

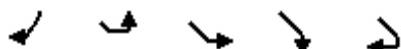
Intersection Capacity Utilization 67.2%

ICU Level of Service C

Analysis Period (min) 15

Splits and Phases: 10: Washington St & Broad St & Spring St





Lane Group	SBR	SEL2	SEL	SER	SER2	Ø9
Lane Configurations						
Traffic Volume (vph)	20	5	60	120	30	
Future Volume (vph)	20	5	60	120	30	
Satd. Flow (prot)	0	0	1678	1501	0	
Flt Permitted			0.950			
Satd. Flow (perm)	0	0	1678	1501	0	
Satd. Flow (RTOR)			145			
Lane Group Flow (vph)	0	0	68	156	0	
Turn Type		Perm	Perm	Perm		
Protected Phases					9	
Permitted Phases		10	10	10		
Total Split (s)	22.0	22.0	22.0		24.0	
Total Lost Time (s)		4.0	4.0			
Act Efect Green (s)		12.2	12.2			
Actuated g/C Ratio		0.10	0.10			
v/c Ratio		0.40	0.55			
Control Delay		56.5	17.3			
Queue Delay		0.0	0.0			
Total Delay		56.5	17.3			
LOS		E	B			
Approach Delay		29.2				
Approach LOS		C				
Queue Length 50th (ft)		50	8			
Queue Length 95th (ft)		94	71			
Internal Link Dist (ft)		258				
Turn Bay Length (ft)		150				
Base Capacity (vph)		251	348			
Starvation Cap Reductn		0	0			
Spillback Cap Reductn		0	0			
Storage Cap Reductn		0	0			
Reduced v/c Ratio		0.27	0.45			
Intersection Summary						

Intersection							
Approach	WB		SB		NE		
Entry Lanes		2		2		2	
Conflicting Circle Lanes		2		2		2	
Adj Approach Flow, veh/h	1531		791		521		
Demand Flow Rate, veh/h	1592		822		542		
Vehicles Circulating, veh/h	390		76		687		
Vehicles Exiting, veh/h	839		1906		76		
Follow-Up Headway, s	3.186		3.186		3.186		
Ped Vol Crossing Leg, #/h	0		0		0		
Ped Cap Adj	1.000		1.000		1.000		
Approach Delay, s/veh	41.4		6.4		13.6		
Approach LOS	E		A		B		
Lane	Left	Right	Left	Right	Bypass	Left	Right
Designated Moves	LTR	R	L	LTR	R	L	TR
Assumed Moves	LTR	R	L	LTR	R	L	TR
RT Channelized					Yield		
Lane Util	0.470	0.530	0.530	0.470		0.720	0.280
Critical Headway, s	4.293	4.113	4.293	4.113		4.293	4.113
Entry Flow, veh/h	748	844	364	323	135	390	152
Cap Entry Lane, veh/h	843	860	1067	1071	1071	675	699
Entry HV Adj Factor	0.962	0.961	0.962	0.962	0.962	0.962	0.961
Flow Entry, veh/h	720	811	350	311	130	375	146
Cap Entry, veh/h	811	827	1027	1031	1030	649	671
V/C Ratio	0.887	0.981	0.341	0.301	0.126	0.578	0.218
Control Delay, s/veh	32.6	49.1	7.0	6.5	4.6	15.7	7.9
LOS	D	E	A	A	A	C	A
95th %tile Queue, veh	12	17	2	1	0	4	1

Lynnway-Route 1A-Carroll Parkway Study  
2: Lynnway & Hanson St

2015 Existing PM  
5:00 pm



Lane Group	WBL	WBR	NBT	NBR	SBL	SBT
Lane Configurations	↑	↑	↑↑↑		↑	↑↑↑
Traffic Volume (vph)	75	100	2140	50	225	1065
Future Volume (vph)	75	100	2140	50	225	1065
Satd. Flow (prot)	1711	1531	4901	0	1711	4916
Flt Permitted	0.950				0.950	
Satd. Flow (perm)	1711	1531	4901	0	1711	4916
Satd. Flow (RTOR)			104	4		
Lane Group Flow (vph)	78	104	2281	0	234	1109
Turn Type	Prot	Perm	NA		Prot	NA
Protected Phases	8		2		1	6
Permitted Phases			8			
Total Split (s)	35.0	35.0	62.0		23.0	85.0
Total Lost Time (s)	5.0	5.0	5.0		5.0	4.0
Act Effct Green (s)	13.9	13.9	69.9		21.2	97.1
Actuated g/C Ratio	0.12	0.12	0.58		0.18	0.81
v/c Ratio	0.40	0.39	0.80		0.77	0.28
Control Delay	52.3	11.8	23.0		46.0	6.4
Queue Delay	0.0	0.0	0.1		0.0	0.0
Total Delay	52.3	11.8	23.0		46.0	6.4
LOS	D	B	C		D	A
Approach Delay	29.2		23.0			13.3
Approach LOS	C		C			B
Queue Length 50th (ft)	59	0	472		100	9
Queue Length 95th (ft)	90	44	#741		#341	301
Internal Link Dist (ft)	376		617			1043
Turn Bay Length (ft)					400	
Base Capacity (vph)	427	460	2856		304	3977
Starvation Cap Reductn	0	0	33		0	0
Spillback Cap Reductn	0	0	0		0	0
Storage Cap Reductn	0	0	0		0	0
Reduced v/c Ratio	0.18	0.23	0.81		0.77	0.28

#### Intersection Summary

Cycle Length: 120

Actuated Cycle Length: 120

Offset: 0 (0%), Referenced to phase 2:NBT and 6:SBT, Start of Green, Master Intersection

Control Type: Actuated-Coordinated

Maximum v/c Ratio: 0.80

Intersection Signal Delay: 19.9

Intersection LOS: B

Intersection Capacity Utilization 73.3%

ICU Level of Service D

Analysis Period (min) 15

# 95th percentile volume exceeds capacity, queue may be longer.

Queue shown is maximum after two cycles.

Splits and Phases: 2: Lynnway & Hanson St



Lynnway-Route 1A-Carroll Parkway Study  
3: Lynnway & Harding St

2015 Existing PM

5:00 pm

Lane Group	NBL	NBT	NBR	SBL	SBT	SBR	NEL	NET	NER	SWL	SWT	SWR	
Lane Configurations													
Traffic Volume (vph)	40	0	40	30	0	5	45	2230	65	165	1195	65	
Future Volume (vph)	40	0	40	30	0	5	45	2230	65	165	1195	65	
Satd. Flow (prot)	1711	1531	0	0	1711	1531	1711	4896	0	1711	4876	0	
Flt Permitted	0.737				0.730			0.950			0.950		
Satd. Flow (perm)	1327	1531	0	0	1314	1531	1711	4896	0	1711	4876	0	
Satd. Flow (RTOR)		207				64		6			11		
Lane Group Flow (vph)	42	42	0	0	31	5	47	2391	0	172	1313	0	
Turn Type	Perm	NA		Perm	NA	Perm	Prot	NA		Prot	NA		
Protected Phases		8				4		5	2		1	6	
Permitted Phases	8				4		4						
Total Split (s)	30.0	30.0		30.0	30.0	30.0	20.0	70.0		20.0	70.0		
Total Lost Time (s)	6.0	6.0			6.0	6.0	5.0	5.0		5.0	5.0		
Act Effct Green (s)	9.3	9.3			9.3	9.3	9.0	79.0		18.0	91.4		
Actuated g/C Ratio	0.08	0.08			0.08	0.08	0.08	0.66		0.15	0.76		
v/c Ratio	0.41	0.14			0.31	0.03	0.37	0.74		0.67	0.35		
Control Delay	63.6	0.9			58.9	0.2	70.4	3.6		56.6	2.9		
Queue Delay	0.0	0.0			0.0	0.0	0.0	0.0		0.0	0.0		
Total Delay	63.6	0.9			58.9	0.2	70.4	3.6		56.6	2.9		
LOS	E	A			E	A	E	A		E	A		
Approach Delay		32.3			50.7			4.9			9.1		
Approach LOS		C			D			A			A		
Queue Length 50th (ft)	32	0			23	0	39	20		140	47		
Queue Length 95th (ft)	68	0			54	0	m52	32		m191	61		
Internal Link Dist (ft)		148			94			1043			1865		
Turn Bay Length (ft)							300			300			
Base Capacity (vph)	265	471			262	357	213	3226		264	3717		
Starvation Cap Reductn	0	0			0	0	0	0		0	0		
Spillback Cap Reductn	0	0			0	0	0	0		0	0		
Storage Cap Reductn	0	0			0	0	0	0		0	0		
Reduced v/c Ratio	0.16	0.09			0.12	0.01	0.22	0.74		0.65	0.35		

Intersection Summary

Cycle Length: 120

Actuated Cycle Length: 120

Offset: 20 (17%), Referenced to phase 2:NET and 6:SWT, Start of Green

Control Type: Actuated-Coordinated

Maximum v/c Ratio: 0.74

Intersection Signal Delay: 7.4

Intersection LOS: A

Intersection Capacity Utilization 75.9%

ICU Level of Service D

Analysis Period (min) 15

m Volume for 95th percentile queue is metered by upstream signal.

Splits and Phases: 3: Lynnway & Harding St



Lynnway-Route 1A-Carroll Parkway Study  
4: Commercial St & Lynnway

2015 Existing PM  
5:00 pm

Lane Group	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations	↑	↑↑↑			↑↑↑	↑				↑	↑	↑
Traffic Volume (vph)	540	1950	5	0	1095	295	0	0	0	340	25	285
Future Volume (vph)	540	1950	5	0	1095	295	0	0	0	340	25	285
Satd. Flow (prot)	1711	4916	0	0	4916	1531	0	0	0	1711	1801	1531
Flt Permitted	0.950									0.950		
Satd. Flow (perm)	1711	4916	0	0	4916	1531	0	0	0	1711	1801	1531
Satd. Flow (RTOR)			1			307						9
Lane Group Flow (vph)	563	2036	0	0	1141	307	0	0	0	354	26	297
Turn Type	Prot	NA			NA	Perm				Perm	NA	pt+ov
Protected Phases	5	2			6					4	4	5
Permitted Phases					6					4		
Total Split (s)	50.0	86.0			36.0	36.0				34.0	34.0	
Total Lost Time (s)	4.0	4.0			4.0	4.0				4.0	4.0	
Act Effct Green (s)	43.0	84.0			37.0	37.0				28.0	28.0	75.0
Actuated g/C Ratio	0.36	0.70			0.31	0.31				0.23	0.23	0.62
v/c Ratio	0.92	0.59			0.75	0.45				0.89	0.06	0.31
Control Delay	43.5	23.5			27.3	7.1				69.0	35.0	10.4
Queue Delay	0.0	0.0			0.0	0.0				0.0	0.0	0.0
Total Delay	43.5	23.5			27.3	7.1				69.0	35.0	10.4
LOS	D	C			C	A				E	C	B
Approach Delay	27.9				23.0					42.0		
Approach LOS	C				C					D		
Queue Length 50th (ft)	457	593			306	150				261	15	84
Queue Length 95th (ft)	#612	645			257	19				#416	39	128
Internal Link Dist (ft)	1865				1085			493		489		
Turn Bay Length (ft)	600				300				200		200	
Base Capacity (vph)	655	3443			1516	684			427	450	992	
Starvation Cap Reductn	0	0			0	0			0	0	0	
Spillback Cap Reductn	0	0			0	0			0	0	0	
Storage Cap Reductn	0	0			0	0			0	0	0	
Reduced v/c Ratio	0.86	0.59			0.75	0.45			0.83	0.06	0.30	

Intersection Summary

Cycle Length: 120

Actuated Cycle Length: 120

Offset: 14 (12%), Referenced to phase 2:EBT and 6:WBT, Start of Green

Control Type: Actuated-Coordinated

Maximum v/c Ratio: 0.92

Intersection Signal Delay: 28.4

Intersection LOS: C

Intersection Capacity Utilization 79.9%

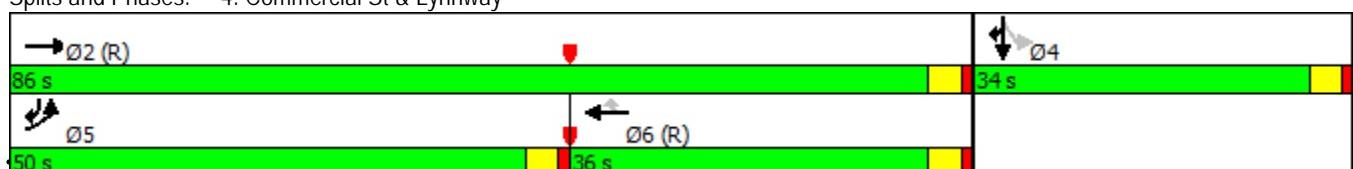
ICU Level of Service D

Analysis Period (min) 15

# 95th percentile volume exceeds capacity, queue may be longer.

Queue shown is maximum after two cycles.

Splits and Phases: 4: Commercial St & Lynnway



Lynnway-Route 1A-Carroll Parkway Study  
5: Marine Blvd/Sheppard St & Lynnway

2015 Existing PM

5:00 pm

Lane Group	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations	↑	↑↑↓		↑	↑↑↓		↑	↑			↔	
Traffic Volume (vph)	175	2105	20	35	1345	20	20	5	10	40	5	25
Future Volume (vph)	175	2105	20	35	1345	20	20	5	10	40	5	25
Satd. Flow (prot)	1711	4911	0	1711	4906	0	1711	1621	0	0	1666	0
Flt Permitted	0.950			0.950			0.739				0.814	
Satd. Flow (perm)	1711	4911	0	1711	4906	0	1331	1621	0	0	1395	0
Satd. Flow (RTOR)		2			2			10			20	
Lane Group Flow (vph)	182	2214	0	36	1422	0	21	15	0	0	73	0
Turn Type	Prot	NA		Prot	NA		Perm	NA		Perm	NA	
Protected Phases	5	2		1	6				8			4
Permitted Phases							8				4	
Total Split (s)	29.0	80.0		13.0	64.0		27.0	27.0		27.0	27.0	
Total Lost Time (s)	6.0	6.0		6.0	6.0		6.0	6.0			6.0	
Act Effct Green (s)	17.7	91.9		7.6	75.4		11.5	11.5			11.5	
Actuated g/C Ratio	0.15	0.77		0.06	0.63		0.10	0.10			0.10	
v/c Ratio	0.73	0.59		0.33	0.46		0.17	0.09			0.48	
Control Delay	74.4	1.4		47.6	22.8		49.8	28.4			47.0	
Queue Delay	0.0	0.0		0.0	0.0		0.0	0.0			0.0	
Total Delay	74.4	1.4		47.6	22.8		49.8	28.4			47.0	
LOS	E	A		D	C		D	C			D	
Approach Delay		7.0			23.4			40.8			47.0	
Approach LOS		A			C			D			D	
Queue Length 50th (ft)	141	35		21	319		15	4			40	
Queue Length 95th (ft)	m208	83		55	381		38	23			81	
Internal Link Dist (ft)		1085			554			123			133	
Turn Bay Length (ft)	250			400								
Base Capacity (vph)	327	3760		108	3083		232	291			260	
Starvation Cap Reductn	0	0		0	0		0	0			0	
Spillback Cap Reductn	0	0		0	0		0	0			0	
Storage Cap Reductn	0	0		0	0		0	0			0	
Reduced v/c Ratio	0.56	0.59		0.33	0.46		0.09	0.05			0.28	

Intersection Summary

Cycle Length: 120

Actuated Cycle Length: 120

Offset: 108 (90%), Referenced to phase 2:EBT and 6:WBT, Start of Green

Control Type: Actuated-Coordinated

Maximum v/c Ratio: 0.73

Intersection Signal Delay: 14.1

Intersection LOS: B

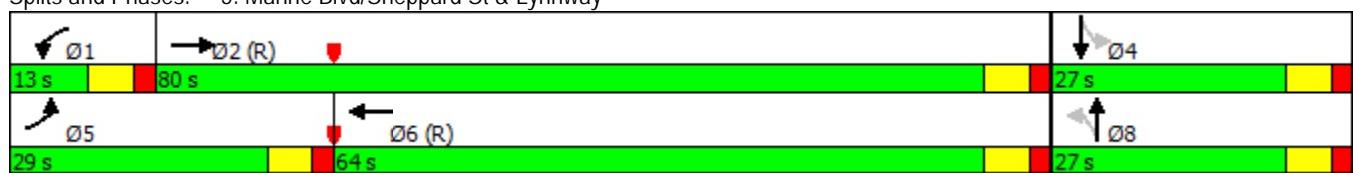
Intersection Capacity Utilization 72.6%

ICU Level of Service C

Analysis Period (min) 15

m Volume for 95th percentile queue is metered by upstream signal.

Splits and Phases: 5: Marine Blvd/Sheppard St & Lynnway



Lynnway-Route 1A-Carroll Parkway Study  
6: Kingman St & Lynnway

2015 Existing PM

5:00 pm

	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations	↑	↑↑↑		↑	↑↑↑		↑	↑				
Traffic Volume (vph)	65	2185	35	75	1290	40	100	5	115	0	0	0
Future Volume (vph)	65	2185	35	75	1290	40	100	5	115	0	0	0
Satd. Flow (prot)	1711	4906	0	1711	4891	0	1711	1541	0	0	0	0
Flt Permitted	0.950			0.950			0.950					
Satd. Flow (perm)	1711	4906	0	1711	4891	0	1711	1541	0	0	0	0
Satd. Flow (RTOR)			3			6			120			
Lane Group Flow (vph)	68	2312	0	78	1386	0	104	125	0	0	0	0
Turn Type	Prot	NA		Prot	NA		Split	NA				
Protected Phases	5	2		1	6		8	8				
Permitted Phases												
Total Split (s)	20.0	70.0		20.0	70.0		30.0	30.0				
Total Lost Time (s)	4.0	4.0		4.0	4.0		4.0	4.0				
Act Effct Green (s)	10.3	85.6		10.9	86.2		13.7	13.7				
Actuated g/C Ratio	0.09	0.71		0.09	0.72		0.11	0.11				
v/c Ratio	0.46	0.66		0.51	0.39		0.53	0.44				
Control Delay	72.3	5.4		66.4	3.3		58.8	13.8				
Queue Delay	0.0	0.0		0.0	0.0		0.0	0.0				
Total Delay	72.3	5.4		66.4	3.3		58.8	13.8				
LOS	E	A		E	A		E	B				
Approach Delay		7.3			6.7			34.2				
Approach LOS		A			A			C				
Queue Length 50th (ft)	51	113		63	47		78	4				
Queue Length 95th (ft)	m82	519		113	80		124	55				
Internal Link Dist (ft)		494			544			258				85
Turn Bay Length (ft)			300									
Base Capacity (vph)	228	3502		228	3515		370	427				
Starvation Cap Reductn	0	0		0	0		0	0				
Spillback Cap Reductn	0	0		0	0		0	0				
Storage Cap Reductn	0	0		0	0		0	0				
Reduced v/c Ratio	0.30	0.66		0.34	0.39		0.28	0.29				

Intersection Summary

Cycle Length: 120

Actuated Cycle Length: 120

Offset: 14 (12%), Referenced to phase 2:EBT and 6:WBT, Start of Green

Control Type: Actuated-Coordinated

Maximum v/c Ratio: 0.66

Intersection Signal Delay: 8.6

Intersection LOS: A

Intersection Capacity Utilization 66.2%

ICU Level of Service C

Analysis Period (min) 15

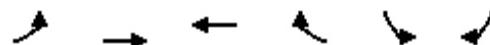
m Volume for 95th percentile queue is metered by upstream signal.

Splits and Phases: 6: Kingman St & Lynnway



Lynnway-Route 1A-Carroll Parkway Study  
7: Lynnway/Carroll Parkway & Market St

2015 Existing PM  
5:00 pm



Lane Group	EBL	EBT	WBT	WBR	SBL	SBR
Lane Configurations	↑↑	↑↑↑↑	↑↑↑↑	↑	↑↑	
Traffic Volume (vph)	815	1450	805	165	215	15
Future Volume (vph)	815	1450	805	165	215	15
Satd. Flow (prot)	3319	4916	4916	1531	3303	0
Flt Permitted	0.950				0.955	
Satd. Flow (perm)	3319	4916	4916	1531	3303	0
Satd. Flow (RTOR)				172	6	
Lane Group Flow (vph)	849	1510	839	172	240	0
Turn Type	Prot	NA	NA	Perm	Prot	
Protected Phases	5	2	6		7	
Permitted Phases				6		
Total Split (s)	54.0	92.0	38.0	38.0	28.0	
Total Lost Time (s)	5.0	4.0	4.0	4.0	4.0	
Act Effct Green (s)	49.0	98.2	44.2	44.2	13.8	
Actuated g/C Ratio	0.41	0.82	0.37	0.37	0.12	
v/c Ratio	0.63	0.38	0.46	0.26	0.62	
Control Delay	27.4	0.7	30.3	5.1	60.7	
Queue Delay	0.1	0.0	0.0	0.0	0.0	
Total Delay	27.5	0.7	30.3	5.1	60.7	
LOS	C	A	C	A	E	
Approach Delay		10.4	26.0		60.7	
Approach LOS		B	C		E	
Queue Length 50th (ft)	351	3	179	0	78	
Queue Length 95th (ft)	349	4	232	48	111	
Internal Link Dist (ft)		429	1170		327	
Turn Bay Length (ft)			600			
Base Capacity (vph)	1355	4022	1810	672	665	
Starvation Cap Reductn	0	0	0	0	0	
Spillback Cap Reductn	28	0	0	4	0	
Storage Cap Reductn	0	0	0	0	0	
Reduced v/c Ratio	0.64	0.38	0.46	0.26	0.36	

#### Intersection Summary

Cycle Length: 120

Actuated Cycle Length: 120

Offset: 24 (20%), Referenced to phase 2:EBT and 6:WBT, Start of Green

Control Type: Actuated-Coordinated

Maximum v/c Ratio: 0.63

Intersection Signal Delay: 18.1

Intersection LOS: B

Intersection Capacity Utilization 56.2%

ICU Level of Service B

Analysis Period (min) 15

Splits and Phases: 7: Lynnway/Carroll Parkway & Market St



Lynnway-Route 1A-Carroll Parkway Study  
9: Broad St & Market St

2015 Existing PM  
5:00 pm

Lane Group	WBL2	WBL	WBR	NBL	NBT	NBR	SBL	SBT	SBR	NEL	NER	Ø9
Lane Configurations												
Traffic Volume (vph)	50	335	205	15	395	570	290	175	160	0	0	
Future Volume (vph)	50	335	205	15	395	570	290	175	160	0	0	
Satd. Flow (prot)	0	3319	1531	0	3414	1531	0	3216	0	0	0	
Flt Permitted		0.950			0.922			0.639				
Satd. Flow (perm)	0	3319	1531	0	3154	1531	0	2103	0	0	0	
Satd. Flow (RTOR)			214			594		58				
Lane Group Flow (vph)	0	401	214	0	427	594	0	651	0	0	0	
Turn Type	Prot	Prot	Perm	Perm	NA	pt+ov	Perm	NA				
Protected Phases	8	8			2	28		6				9
Permitted Phases			8	2			6					
Total Split (s)	27.0	27.0	27.0	66.0	66.0		66.0	66.0				27.0
Total Lost Time (s)		5.0	5.0		5.0			5.0				
Act Effct Green (s)	20.1	20.1		73.7	100.8		73.7					
Actuated g/C Ratio	0.17	0.17		0.61	0.84		0.61					
v/c Ratio	0.72	0.49		0.22	0.43		0.50					
Control Delay	51.0	14.6		22.6	13.1		16.1					
Queue Delay	0.0	0.0		0.0	0.7		0.0					
Total Delay	51.0	14.6		22.6	13.8		16.1					
LOS	D	B		C	B		B					
Approach Delay	38.3			17.5			16.1					
Approach LOS	D			B			B					
Queue Length 50th (ft)	166	4		173	260		162					
Queue Length 95th (ft)	219	138		218	324		226					
Internal Link Dist (ft)	246			327			471		2			
Turn Bay Length (ft)												
Base Capacity (vph)	608	455		1937	1378		1314					
Starvation Cap Reductn	0	0		0	449		0					
Spillback Cap Reductn	0	0		0	0		0					
Storage Cap Reductn	0	0		0	0		0					
Reduced v/c Ratio	0.66	0.47		0.22	0.64		0.50					

Intersection Summary

Cycle Length: 120

Actuated Cycle Length: 120

Offset: 112 (93%), Referenced to phase 2:NBTL and 6:SBTL, Start of Green

Control Type: Actuated-Coordinated

Maximum v/c Ratio: 0.72

Intersection Signal Delay: 22.7

Intersection LOS: C

Intersection Capacity Utilization 62.0%

ICU Level of Service B

Analysis Period (min) 15

Splits and Phases: 9: Broad St & Market St



Lynnway-Route 1A-Carroll Parkway Study  
10: Washington St & Broad St & Spring St

2015 Existing PM

5:00 pm



Lane Group	EBL	EBT	EBR	WBL	WBT	WBR2	NBL2	NBL	NBT	NBR	SBL	SBT
Lane Configurations												
Traffic Volume (vph)	15	415	405	20	375	5	105	0	75	25	5	20
Future Volume (vph)	15	415	405	20	375	5	105	0	75	25	5	20
Satd. Flow (prot)	0	1797	1531	0	3404	0	0	1711	1732	0	0	1616
Flt Permitted		0.978			0.918			0.625				0.984
Satd. Flow (perm)	0	1761	1531	0	3134	0	0	1125	1732	0	0	1595
Satd. Flow (RTOR)			422		127			12				
Lane Group Flow (vph)	0	448	422	0	417	0	0	109	104	0	0	99
Turn Type	Perm	NA	Perm	Perm	NA		Perm	Perm	NA		Perm	NA
Protected Phases		2			6				8			4
Permitted Phases	2		2	6			8	8			4	
Total Split (s)	44.0	44.0	44.0	44.0	44.0		30.0	30.0	30.0		30.0	30.0
Total Lost Time (s)		7.0	7.0		7.0			6.0	6.0			6.0
Act Effct Green (s)	66.7	66.7		66.7			16.0	16.0				16.0
Actuated g/C Ratio	0.56	0.56		0.56			0.13	0.13				0.13
v/c Ratio	0.46	0.41		0.23			0.73	0.43				0.46
Control Delay	16.0	2.8		12.5			75.2	46.2				53.7
Queue Delay	0.0	0.0		0.0			0.0	0.0				0.0
Total Delay	16.0	2.8		12.5			75.2	46.2				53.7
LOS	B	A		B			E	D				D
Approach Delay	9.6			12.5				61.1				53.7
Approach LOS	A			B			E					D
Queue Length 50th (ft)	63	0		50			82	66				72
Queue Length 95th (ft)	#473	63		137			138	115				120
Internal Link Dist (ft)	389			409				413				214
Turn Bay Length (ft)							150					
Base Capacity (vph)	978	1038		1797			225	356				319
Starvation Cap Reductn	0	0		0			0	0				0
Spillback Cap Reductn	0	0		0			0	0				0
Storage Cap Reductn	0	0		0			0	0				0
Reduced v/c Ratio	0.46	0.41		0.23			0.48	0.29				0.31

#### Intersection Summary

Cycle Length: 120

Actuated Cycle Length: 120

Offset: 112 (93%), Referenced to phase 2:EBTL and 6:WBTL, Start of Green

Control Type: Actuated-Coordinated

Maximum v/c Ratio: 0.73

Intersection Signal Delay: 22.5

Intersection LOS: C

Intersection Capacity Utilization 72.6%

ICU Level of Service C

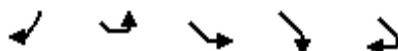
Analysis Period (min) 15

# 95th percentile volume exceeds capacity, queue may be longer.

Queue shown is maximum after two cycles.

Splits and Phases: 10: Washington St & Broad St & Spring St





Lane Group	SBR	SEL2	SEL	SER	SER2	Ø9
Lane Configurations						
Traffic Volume (vph)	70	15	105	100	30	
Future Volume (vph)	70	15	105	100	30	
Satd. Flow (prot)	0	0	1711	1531	0	
Flt Permitted			0.950			
Satd. Flow (perm)	0	0	1711	1531	0	
Satd. Flow (RTOR)			136			
Lane Group Flow (vph)	0	0	125	135	0	
Turn Type		Prot	Prot	Prot		
Protected Phases		10	10	10		9
Permitted Phases						
Total Split (s)		23.0	23.0	23.0		23.0
Total Lost Time (s)			6.0	6.0		
Act Effct Green (s)			13.7	13.7		
Actuated g/C Ratio			0.11	0.11		
v/c Ratio			0.64	0.46		
Control Delay			65.3	12.8		
Queue Delay			0.0	0.0		
Total Delay			65.3	12.8		
LOS		E	B			
Approach Delay			38.0			
Approach LOS			D			
Queue Length 50th (ft)			94	0		
Queue Length 95th (ft)			154	56		
Internal Link Dist (ft)			258			
Turn Bay Length (ft)			150			
Base Capacity (vph)			245	335		
Starvation Cap Reductn			0	0		
Spillback Cap Reductn			0	0		
Storage Cap Reductn			0	0		
Reduced v/c Ratio			0.51	0.40		

#### Intersection Summary

**Intersection**

Intersection Delay, s/veh 15.2

Intersection LOS C

Approach	WB	SB	NE
Entry Lanes	2	2	2
Conflicting Circle Lanes	2	2	2
Adj Approach Flow, veh/h	833	1719	406
Demand Flow Rate, veh/h	850	1753	414
Vehicles Circulating, veh/h	393	212	1424
Vehicles Exiting, veh/h	1445	1030	212
Follow-Up Headway, s	3.186	3.186	3.186
Ped Vol Crossing Leg, #/h	0	0	0
Ped Cap Adj	1.000	1.000	1.000
Approach Delay, s/veh	11.1	15.7	21.4
Approach LOS	B	C	C

Lane	Left	Right	Left	Right	Bypass	Left	Right
Designated Moves	LTR	R	L	LTR	R	L	LTR
Assumed Moves	LTR	R	L	LTR	R	L	LTR
RT Channelized					Yield		
Lane Util	0.471	0.529	0.530	0.470		0.529	0.471
Critical Headway, s	4.293	4.113	4.293	4.113		4.293	4.113
Entry Flow, veh/h	400	450	755	669	329	219	195
Cap Entry Lane, veh/h	841	858	964	974	974	388	417
Entry HV Adj Factor	0.979	0.981	0.980	0.981	0.980	0.983	0.979
Flow Entry, veh/h	392	441	740	656	323	215	191
Cap Entry, veh/h	824	842	945	955	955	382	408
V/C Ratio	0.475	0.524	0.783	0.687	0.338	0.564	0.468
Control Delay, s/veh	10.6	11.5	20.0	15.0	7.4	23.8	18.7
LOS	B	B	C	C	A	C	C
95th %tile Queue, veh	3	3	8	6	2	3	2



Lane Group	WBL	WBR	NBT	NBR	SBL	SBT
Lane Configurations	↑ ↘	↑ ↗	↑↑ ↗	↑ ↙	↑ ↘	↑↑ ↗
Traffic Volume (vph)	95	180	1530	120	260	1450
Future Volume (vph)	95	180	1530	120	260	1450
Satd. Flow (prot)	1678	1501	4768	0	1678	4821
Flt Permitted	0.950				0.950	
Satd. Flow (perm)	1678	1501	4768	0	1678	4821
Satd. Flow (RTOR)			188	14		
Lane Group Flow (vph)	99	188	1719	0	271	1510
Turn Type	Prot	Perm	NA		Prot	NA
Protected Phases	8		2		1	6
Permitted Phases			8			
Total Split (s)	35.0	35.0	63.0		22.0	85.0
Total Lost Time (s)	5.0	5.0	5.0		5.0	4.0
Act Efect Green (s)	15.0	15.0	62.0		28.1	96.0
Actuated g/C Ratio	0.12	0.12	0.52		0.23	0.80
v/c Ratio	0.47	0.54	0.70		0.69	0.39
Control Delay	54.1	11.4	23.9		50.0	5.8
Queue Delay	0.0	0.0	0.0		0.0	0.0
Total Delay	54.1	11.4	23.9		50.0	5.8
LOS	D	B	C		D	A
Approach Delay	26.2			23.9		12.5
Approach LOS	C			C		B
Queue Length 50th (ft)	74	0	343		158	120
Queue Length 95th (ft)	110	58	440	#408	430	
Internal Link Dist (ft)	376		617			1043
Turn Bay Length (ft)					400	
Base Capacity (vph)	419	516	2469		392	3858
Starvation Cap Reductn	0	0	0		0	0
Spillback Cap Reductn	0	0	0		0	0
Storage Cap Reductn	0	0	0		0	0
Reduced v/c Ratio	0.24	0.36	0.70		0.69	0.39

#### Intersection Summary

Cycle Length: 120

Actuated Cycle Length: 120

Offset: 0 (0%), Referenced to phase 2:NBT and 6:SBT, Start of Green, Master Intersection

Control Type: Actuated-Coordinated

Maximum v/c Ratio: 0.70

Intersection Signal Delay: 18.7

Intersection LOS: B

Intersection Capacity Utilization 65.0%

ICU Level of Service C

Analysis Period (min) 15

# 95th percentile volume exceeds capacity, queue may be longer.

Queue shown is maximum after two cycles.

Splits and Phases: 2: Lynnway & Hanson St



Lane Group	NBL	NBT	NBR	SBL	SBT	SBR	NEL	NET	NER	SWL	SWT	SWR
Lane Configurations	↑	↑			↑	↑	↑	↑↑↑		↑	↑↑↑	
Traffic Volume (vph)	35	5	40	15	5	5	85	1555	75	200	1630	15
Future Volume (vph)	35	5	40	15	5	5	85	1555	75	200	1630	15
Satd. Flow (prot)	1678	1529	0	0	1701	1501	1678	4788	0	1678	4816	0
Flt Permitted	0.744				0.746		0.950			0.950		
Satd. Flow (perm)	1314	1529	0	0	1317	1501	1678	4788	0	1678	4816	0
Satd. Flow (RTOR)			42			109		9			2	
Lane Group Flow (vph)	36	47	0	0	21	5	89	1698	0	208	1714	0
Turn Type	Perm	NA		Perm	NA	Perm	Prot	NA	Prot	NA		
Protected Phases		8			4		5	2		1	6	
Permitted Phases	8				4		4					
Total Split (s)	30.0	30.0		30.0	30.0	30.0	20.0	70.0		20.0	70.0	
Total Lost Time (s)	6.0	6.0			6.0	6.0	5.0	5.0		5.0	5.0	
Act Efct Green (s)	8.8	8.8			8.8	8.8	15.0	74.4		23.2	82.5	
Actuated g/C Ratio	0.07	0.07			0.07	0.07	0.12	0.62		0.19	0.69	
v/c Ratio	0.38	0.31			0.22	0.02	0.43	0.57		0.64	0.52	
Control Delay	63.1	23.1			56.5	0.2	75.2	33.7		72.4	6.5	
Queue Delay	0.0	0.0			0.0	0.0	0.0	0.0		0.0	0.0	
Total Delay	63.1	23.1			56.5	0.2	75.2	33.7		72.4	6.5	
LOS	E	C			E	A	E	C		E	A	
Approach Delay		40.4			45.6			35.8			13.6	
Approach LOS		D			D			D			B	
Queue Length 50th (ft)	27	4			16	0	58	395		166	120	
Queue Length 95th (ft)	61	41			41	0	m100	515		241	143	
Internal Link Dist (ft)		148			94			1043			1847	
Turn Bay Length (ft)							300			300		
Base Capacity (vph)	262	339			263	387	209	2970		323	3312	
Starvation Cap Reductn	0	0			0	0	0	0		0	0	
Spillback Cap Reductn	0	0			0	0	0	0		0	0	
Storage Cap Reductn	0	0			0	0	0	0		0	0	
Reduced v/c Ratio	0.14	0.14			0.08	0.01	0.43	0.57		0.64	0.52	

#### Intersection Summary

Cycle Length: 120

Actuated Cycle Length: 120

Offset: 81 (68%), Referenced to phase 2:NET and 6:SWT, Start of Green

Control Type: Actuated-Coordinated

Maximum v/c Ratio: 0.64

Intersection Signal Delay: 24.8

Intersection LOS: C

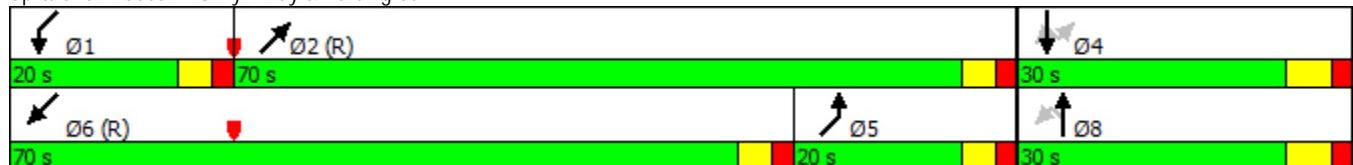
Intersection Capacity Utilization 64.7%

ICU Level of Service C

Analysis Period (min) 15

m Volume for 95th percentile queue is metered by upstream signal.

Splits and Phases: 3: Lynnway & Harding St





Lane Group	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations	↑	↑↑↑			↑↑↑	↑				↑	↑	↑
Traffic Volume (vph)	550	1380	10	0	1190	260	0	0	0	330	80	460
Future Volume (vph)	550	1380	10	0	1190	260	0	0	0	330	80	460
Satd. Flow (prot)	1678	4816	0	0	4821	1501	0	0	0	1678	1766	1501
Flt Permitted	0.950									0.950		
Satd. Flow (perm)	1678	4816	0	0	4821	1501	0	0	0	1678	1766	1501
Satd. Flow (RTOR)			2			271						13
Lane Group Flow (vph)	573	1448	0	0	1240	271	0	0	0	344	83	479
Turn Type	Prot	NA			NA	Perm				Perm	NA	pt+ov
Protected Phases	5	2			6					4		4 5
Permitted Phases					6					4		
Total Split (s)	40.0	90.0			50.0	50.0				30.0	30.0	
Total Lost Time (s)	4.0	4.0			4.0	4.0				4.0	4.0	
Act Efct Green (s)	36.0	86.0			46.0	46.0				26.0	26.0	66.0
Actuated g/C Ratio	0.30	0.72			0.38	0.38				0.22	0.22	0.55
v/c Ratio	1.14	0.42			0.67	0.37				0.95	0.22	0.58
Control Delay	126.2	14.7			39.4	16.2				83.0	40.5	20.7
Queue Delay	0.0	0.0			0.0	0.0				0.0	0.0	0.0
Total Delay	126.2	14.7			39.4	16.2				83.0	40.5	20.7
LOS	F	B			D	B				F	D	C
Approach Delay		46.3			35.2						46.2	
Approach LOS		D			D						D	
Queue Length 50th (ft)	-498	216			366	102				265	53	227
Queue Length 95th (ft)	#723	404			419	210				#448	99	333
Internal Link Dist (ft)		1847			1063			493			489	
Turn Bay Length (ft)	600				300					200		200
Base Capacity (vph)	503	3454			1850	742				363	382	831
Starvation Cap Reductn	0	0			0	0				0	0	0
Spillback Cap Reductn	0	0			0	0				0	0	0
Storage Cap Reductn	0	0			0	0				0	0	0
Reduced v/c Ratio	1.14	0.42			0.67	0.37				0.95	0.22	0.58

#### Intersection Summary

Cycle Length: 120

Actuated Cycle Length: 120

Offset: 37 (31%), Referenced to phase 2:EBT and 6:WBT, Start of Green

Control Type: Actuated-Coordinated

Maximum v/c Ratio: 1.14

Intersection Signal Delay: 42.5

Intersection LOS: D

Intersection Capacity Utilization 81.7%

ICU Level of Service D

Analysis Period (min) 15

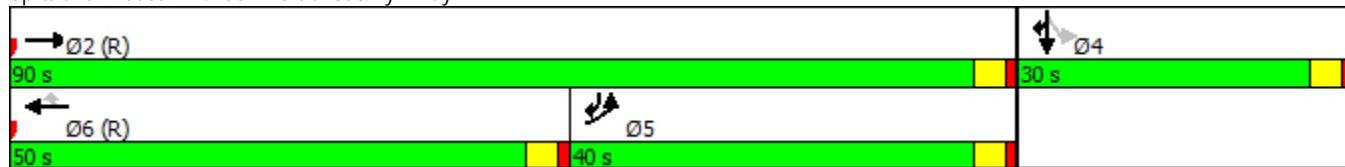
~ Volume exceeds capacity, queue is theoretically infinite.

Queue shown is maximum after two cycles.

# 95th percentile volume exceeds capacity, queue may be longer.

Queue shown is maximum after two cycles.

Splits and Phases: 4: Commercial St & Lynnway



Lane Group	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations	↑	↑↑↑		↑	↑↑↑		↑	↑		↔		
Traffic Volume (vph)	115	1560	5	55	1400	50	5	5	5	35	5	30
Future Volume (vph)	115	1560	5	55	1400	50	5	5	5	35	5	30
Satd. Flow (prot)	1678	4821	0	1678	4797	0	1678	1634	0	0	1624	0
Flt Permitted	0.950			0.950			0.737				0.837	
Satd. Flow (perm)	1678	4821	0	1678	4797	0	1302	1634	0	0	1392	0
Satd. Flow (RTOR)		1			8			5			26	
Lane Group Flow (vph)	120	1630	0	57	1510	0	5	10	0	0	72	0
Turn Type	Prot	NA		Prot	NA		Perm	NA		Perm	NA	
Protected Phases	5	2		1	6				8			4
Permitted Phases							8				4	
Total Split (s)	20.0	77.0		20.0	77.0		23.0	23.0		23.0	23.0	
Total Lost Time (s)	5.0	5.0		5.0	5.0		6.0	6.0			6.0	
Act Efect Green (s)	13.0	86.2		13.4	83.2		10.4	10.4			10.4	
Actuated g/C Ratio	0.11	0.72		0.11	0.69		0.09	0.09			0.09	
v/c Ratio	0.66	0.47		0.30	0.45		0.04	0.07			0.50	
Control Delay	52.6	13.9		43.1	2.3		47.8	35.8			46.0	
Queue Delay	0.0	0.0		0.0	0.0		0.0	0.0			0.0	
Total Delay	52.6	13.9		43.1	2.3		47.8	35.8			46.0	
LOS	D	B		D	A		D	D			D	
Approach Delay		16.5			3.8			39.8			46.0	
Approach LOS		B			A			D			D	
Queue Length 50th (ft)	69	390		45	51		4	4			35	
Queue Length 95th (ft)	m122	m502		90	28		16	20			79	
Internal Link Dist (ft)		1063			584			95			161	
Turn Bay Length (ft)	250			400								
Base Capacity (vph)	212	3462		209	3327		184	235			219	
Starvation Cap Reductn	0	0		0	0		0	0			0	
Spillback Cap Reductn	0	0		0	0		0	0			0	
Storage Cap Reductn	0	0		0	0		0	0			0	
Reduced v/c Ratio	0.57	0.47		0.27	0.45		0.03	0.04			0.33	

#### Intersection Summary

Cycle Length: 120

Actuated Cycle Length: 120

Offset: 91 (76%), Referenced to phase 2:EBT and 6:WBT, Start of Green

Control Type: Actuated-Coordinated

Maximum v/c Ratio: 0.66

Intersection Signal Delay: 11.4

Intersection LOS: B

Intersection Capacity Utilization 60.1%

ICU Level of Service B

Analysis Period (min) 15

m Volume for 95th percentile queue is metered by upstream signal.

Splits and Phases: 5: Marine Blvd/Sheppard St & Lynnway





Lane Group	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations	↑	↑↑↑		↑	↑↑↑		↑	↑				
Traffic Volume (vph)	65	1530	15	15	1500	40	30	0	30	0	0	0
Future Volume (vph)	65	1530	15	15	1500	40	30	0	30	0	0	0
Satd. Flow (prot)	1678	4816	0	1678	4802	0	1678	1501	0	0	0	0
Flt Permitted	0.950				0.950			0.950				
Satd. Flow (perm)	1678	4816	0	1678	4802	0	1678	1501	0	0	0	0
Satd. Flow (RTOR)		2			5			230				
Lane Group Flow (vph)	68	1610	0	16	1605	0	31	31	0	0	0	0
Turn Type	Prot	NA		Prot	NA		Split	NA				
Protected Phases	5	2		1	6		8	8				
Permitted Phases												
Total Split (s)	20.0	70.0		20.0	70.0		30.0	30.0				
Total Lost Time (s)	4.0	4.0		4.0	4.0		4.0	4.0				
Act Efct Green (s)	10.4	99.7		7.4	92.3		10.3	10.3				
Actuated g/C Ratio	0.09	0.83		0.06	0.77		0.09	0.09				
v/c Ratio	0.47	0.40		0.16	0.43		0.22	0.09				
Control Delay	63.0	1.3		73.3	3.9		51.5	0.5				
Queue Delay	0.0	0.0		0.0	0.0		0.0	0.0				
Total Delay	63.0	1.3		73.3	3.9		51.5	0.5				
LOS	E	A		E	A		D	A				
Approach Delay		3.8			4.6			26.0				
Approach LOS		A			A			C				
Queue Length 50th (ft)	49	8		13	41		23	0				
Queue Length 95th (ft)	107	37		m29	84		48	0				
Internal Link Dist (ft)		497			543			258			85	
Turn Bay Length (ft)				300								
Base Capacity (vph)	223	4000		223	3693		363	505				
Starvation Cap Reductn	0	0		0	0		0	0				
Spillback Cap Reductn	0	0		0	0		0	0				
Storage Cap Reductn	0	0		0	0		0	0				
Reduced v/c Ratio	0.30	0.40		0.07	0.43		0.09	0.06				

#### Intersection Summary

Cycle Length: 120

Actuated Cycle Length: 120

Offset: 78 (65%), Referenced to phase 2:EBT and 6:WBT, Start of Green

Control Type: Actuated-Coordinated

Maximum v/c Ratio: 0.47

Intersection Signal Delay: 4.6

Intersection LOS: A

Intersection Capacity Utilization 49.1%

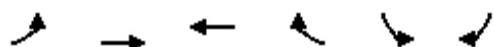
ICU Level of Service A

Analysis Period (min) 15

m Volume for 95th percentile queue is metered by upstream signal.

Splits and Phases: 6: Kingman St & Lynnway





Lane Group	EBL	EBT	WBT	WBR	SBL	SBR
Lane Configurations	↑↑	↑↑↑	↑↑↑	↑	↑↑	
Traffic Volume (vph)	600	985	970	225	300	10
Future Volume (vph)	600	985	970	225	300	10
Satd. Flow (prot)	3255	4821	4821	1501	3252	0
Flt Permitted	0.950				0.954	
Satd. Flow (perm)	3255	4821	4821	1501	3252	0
Satd. Flow (RTOR)				234	3	
Lane Group Flow (vph)	625	1026	1010	234	323	0
Turn Type	Prot	NA	NA	Perm	Prot	
Protected Phases	5	2	6		7	
Permitted Phases				6		
Total Split (s)	50.0	80.0	30.0	30.0	40.0	
Total Lost Time (s)	5.0	4.0	4.0	4.0	4.0	
Act Efect Green (s)	45.0	94.8	44.8	44.8	17.2	
Actuated g/C Ratio	0.38	0.79	0.37	0.37	0.14	
v/c Ratio	0.51	0.27	0.56	0.33	0.69	
Control Delay	19.7	3.5	31.8	4.9	49.7	
Queue Delay	0.0	0.0	0.0	0.0	0.0	
Total Delay	19.7	3.5	31.8	4.9	49.7	
LOS	B	A	C	A	D	
Approach Delay		9.6	26.8		49.7	
Approach LOS		A	C		D	
Queue Length 50th (ft)	66	11	224	0	126	
Queue Length 95th (ft)	158	131	289	56	151	
Internal Link Dist (ft)		431	1171		315	
Turn Bay Length (ft)			600			
Base Capacity (vph)	1220	3808	1799	707	977	
Starvation Cap Reductn	0	0	0	0	0	
Spillback Cap Reductn	0	0	0	0	0	
Storage Cap Reductn	0	0	0	0	0	
Reduced v/c Ratio	0.51	0.27	0.56	0.33	0.33	

#### Intersection Summary

Cycle Length: 120

Actuated Cycle Length: 120

Offset: 68 (57%), Referenced to phase 2:EBT and 6:WBT, Start of Green

Control Type: Actuated-Coordinated

Maximum v/c Ratio: 0.69

Intersection Signal Delay: 20.3

Intersection LOS: C

Intersection Capacity Utilization 55.6%

ICU Level of Service B

Analysis Period (min) 15

Splits and Phases: 7: Lynnway/Carroll Parkway & Market St



	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations					↑↑	↑	↑↑	↑↑	↑	↑↑	↑↑	
Traffic Volume (vph)	0	0	0	75	410	175	15	375	380	205	230	155
Future Volume (vph)	0	0	0	75	410	175	15	375	380	205	230	155
Satd. Flow (prot)	0	0	0	0	3329	1501	0	3349	1501	0	3170	0
Flt Permitted					0.992			0.922			0.677	
Satd. Flow (perm)	0	0	0	0	3329	1501	0	3094	1501	0	2183	0
Satd. Flow (RTOR)					182			396			47	
Lane Group Flow (vph)	0	0	0	0	505	182	0	407	396	0	615	0
Turn Type				Split	NA	Perm	Perm	NA	pt+ov	Perm	NA	
Protected Phases				3	3			2	2 3		6	
Permitted Phases						3	2				6	
Total Split (s)				43.0	43.0	43.0	50.0	50.0		50.0	50.0	
Total Lost Time (s)					4.0	4.0		5.0			5.0	
Act Efect Green (s)					27.5	27.5		67.3	100.8		67.3	
Actuated g/C Ratio					0.23	0.23		0.56	0.84		0.56	
v/c Ratio					0.66	0.38		0.23	0.30		0.49	
Control Delay					46.9	16.1		7.1	2.1		20.6	
Queue Delay					0.0	0.0		0.0	0.4		0.0	
Total Delay					46.9	16.1		7.1	2.5		20.6	
LOS					D	B		A	A		C	
Approach Delay					38.8			4.8			20.6	
Approach LOS					D			A			C	
Queue Length 50th (ft)					197	12		24	0		163	
Queue Length 95th (ft)					248	127		131	135		260	
Internal Link Dist (ft)	27				734			315			249	
Turn Bay Length (ft)					150							
Base Capacity (vph)					1081	610		1734	1366		1244	
Starvation Cap Reductn					0	0		0	520		0	
Spillback Cap Reductn					0	0		0	0		0	
Storage Cap Reductn					0	0		0	0		0	
Reduced v/c Ratio					0.47	0.30		0.23	0.47		0.49	

#### Intersection Summary

Cycle Length: 120

Actuated Cycle Length: 120

Offset: 0 (0%), Referenced to phase 2:NBT and 6:SBTL, Start of Green

Control Type: Actuated-Coordinated

Maximum v/c Ratio: 0.66

Intersection Signal Delay: 20.5

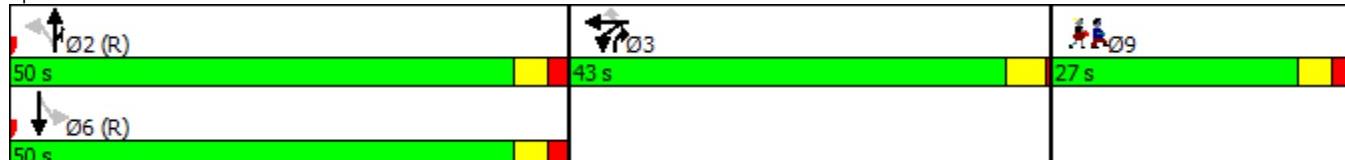
Intersection LOS: C

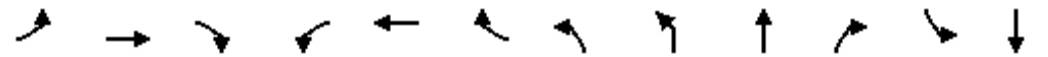
Intersection Capacity Utilization 53.3%

ICU Level of Service A

Analysis Period (min) 15

Splits and Phases: 9: Market St & Broad St





Lane Group	EBL	EBT	EBR	WBL	WBT	WBR2	NBL2	NBL	NBT	NBR	SBL	SBT
Lane Configurations												
Traffic Volume (vph)	55	490	30	25	580	15	20	0	50	15	10	15
Future Volume (vph)	55	490	30	25	580	15	20	0	50	15	10	15
Satd. Flow (prot)	0	1757	1501	0	3335	0	0	1678	1704	0	0	1622
Flt Permitted		0.878			0.914			0.814				0.923
Satd. Flow (perm)	0	1551	1501	0	3055	0	0	1438	1704	0	0	1511
Satd. Flow (RTOR)			136		136				11			
Lane Group Flow (vph)	0	567	31	0	646	0	0	21	68	0	0	57
Turn Type	Perm	NA	Perm	Perm	NA		Perm	Perm	NA		Perm	NA
Protected Phases		2			6				8			4
Permitted Phases	2		2	6				8	8			4
Total Split (s)	50.0	50.0	50.0	50.0	50.0			24.0	24.0	24.0		24.0
Total Lost Time (s)			7.0	7.0		7.0			5.0	5.0		6.0
Act Efct Green (s)	84.1	84.1			84.1				10.5	10.5		9.8
Actuated g/C Ratio	0.70	0.70			0.70				0.09	0.09		0.08
v/c Ratio	0.52	0.03			0.30				0.17	0.43		0.46
Control Delay	12.5	0.1			9.1				51.9	50.7		63.9
Queue Delay	0.0	0.0			0.0				0.0	0.0		0.0
Total Delay	12.5	0.1			9.1				51.9	50.7		63.9
LOS	B	A			A				D	D		E
Approach Delay	11.8				9.1					51.0		63.9
Approach LOS	B				A					D		E
Queue Length 50th (ft)	59	0			70				15	42		43
Queue Length 95th (ft)	#286	m0			195				40	87		85
Internal Link Dist (ft)	734				418					457		220
Turn Bay Length (ft)								150				
Base Capacity (vph)	1086	1092			2181				227	279		226
Starvation Cap Reductn	0	0			0				0	0		0
Spillback Cap Reductn	0	0			0				0	0		0
Storage Cap Reductn	0	0			0				0	0		0
Reduced v/c Ratio	0.52	0.03			0.30				0.09	0.24		0.25

#### Intersection Summary

Cycle Length: 120

Actuated Cycle Length: 120

Offset: 0 (0%), Referenced to phase 2:EBTL and 6:WBTL, Start of Green

Control Type: Actuated-Coordinated

Maximum v/c Ratio: 0.52

Intersection Signal Delay: 15.8

Intersection LOS: B

Intersection Capacity Utilization 82.5%

ICU Level of Service E

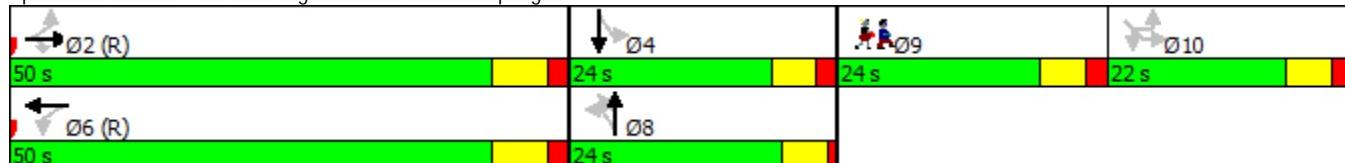
Analysis Period (min) 15

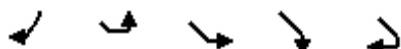
# 95th percentile volume exceeds capacity, queue may be longer.

Queue shown is maximum after two cycles.

m Volume for 95th percentile queue is metered by upstream signal.

Splits and Phases: 10: Washington St & Broad St & Spring St





Lane Group	SBR	SEL2	SEL	SER	SER2	Ø9
Lane Configurations			2	2		
Traffic Volume (vph)	30	5	35	50	30	
Future Volume (vph)	30	5	35	50	30	
Satd. Flow (prot)	0	0	1678	1501	0	
Flt Permitted			0.950			
Satd. Flow (perm)	0	0	1678	1501	0	
Satd. Flow (RTOR)			145			
Lane Group Flow (vph)	0	0	41	83	0	
Turn Type		Perm	Perm	Perm		
Protected Phases					9	
Permitted Phases	10	10	10			
Total Split (s)	22.0	22.0	22.0		24.0	
Total Lost Time (s)		6.0	6.0			
Act Efct Green (s)		8.4	8.4			
Actuated g/C Ratio		0.07	0.07			
v/c Ratio		0.35	0.35			
Control Delay		60.6	4.2			
Queue Delay		0.0	0.0			
Total Delay		60.6	4.2			
LOS		E	A			
Approach Delay		22.8				
Approach LOS		C				
Queue Length 50th (ft)		31	0			
Queue Length 95th (ft)		67	3			
Internal Link Dist (ft)		258				
Turn Bay Length (ft)		150				
Base Capacity (vph)		223	325			
Starvation Cap Reductn		0	0			
Spillback Cap Reductn		0	0			
Storage Cap Reductn		0	0			
Reduced v/c Ratio		0.18	0.26			
Intersection Summary						

Intersection							
Approach	WB		SB		NE		
Entry Lanes	2			2			2
Conflicting Circle Lanes	2			2			2
Adj Approach Flow, veh/h	1037			1411			860
Demand Flow Rate, veh/h	1079			1467			895
Vehicles Circulating, veh/h	488			309			785
Vehicles Exiting, veh/h	1192			1258			309
Follow-Up Headway, s	3.186			3.186			3.186
Ped Vol Crossing Leg, #/h	0			0			0
Ped Cap Adj	1.000			1.000			1.000
Approach Delay, s/veh	17.7			14.0			23.2
Approach LOS	C			B			C
Lane	Left	Right	Left	Right	Bypass	Left	Right
Designated Moves	LTR	R	L	LTR	R	L	TR
Assumed Moves	LTR	R	L	LTR	R	L	TR
RT Channelized	Yield						
Lane Util	0.470	0.530	0.530	0.470	0.545		
Critical Headway, s	4.293	4.113	4.293	4.113	4.293		
Entry Flow, veh/h	507	572	416	369	682	488	407
Cap Entry Lane, veh/h	784	803	896	910	910	627	652
Entry HV Adj Factor	0.961	0.961	0.962	0.962	0.962	0.961	0.961
Flow Entry, veh/h	487	550	400	355	656	469	391
Cap Entry, veh/h	753	772	862	875	875	603	627
V/C Ratio	0.647	0.712	0.464	0.405	0.750	0.778	0.624
Control Delay, s/veh	16.3	18.9	10.1	8.9	19.1	27.6	17.9
LOS	C	C	B	A	C	D	C
95th %tile Queue, veh	5	6	2	2	7	7	4

**TABLE 1**  
**Existing Conditions: Traffic Queue Lengths in Feet**

Intersection/Approach	Movement	Weekday AM 50 <sup>th</sup> Percentile	Weekday AM 95 <sup>th</sup> Percentile	Weekday PM 50 <sup>th</sup> Percentile	Weekday PM 95 <sup>th</sup> Percentile	Saturday PM 50 <sup>th</sup> Percentile	Saturday PM 95 <sup>th</sup> Percentile
Lynnway and Hanson Street	--	--	--	--	--	--	--
Lynnway	NB – Through/right	100	231	472	#741	343	440
Lynnway	SB – Left	111	178	100	#341	158	#408
Lynnway	SB – Through/right	0	198	9	301	120	430
Hanson Street	WB – Left	16	33	59	90	74	110
Hanson Street	WB – Right	0	18	0	44	0	58
Lynnway and Harding Street	--	--	--	--	--	--	--
Lynnway	NB – Left	18	24	39	m52	58	m100
Lynnway	NB – Through/right	83	149	20	32	395	515
Lynnway	SB – Left	58	m67	140	m191	166	241
Lynnway	SB – Through/right	122	160	47	m61	120	143
Harding Street	WB – Left	19	48	32	68	27	61
Harding Street	WB – Through/right	0	0	0	0	4	41
Harding Street	EB – Left/Through	16	94	23	54	16	41
Harding Street	EB – Right	0	0	0	0	0	0
Lynnway and Commercial Street	--	--	--	--	--	--	--
Lynnway	NB – Left	222	#324	457	#612	~498	#732
Lynnway	NB – Through/right	113	239	593	645	216	404
Lynnway	SB – Through	631	681	306	257	366	419
Lynnway	SB – Right	103	143	150	190	102	210
Commercial Street	EB – Left	184	279	261	#461	265	#448
Commercial Street	EB – Through	64	115	15	39	53	99
Commercial Street	EB -- Right	351	511	84	128	227	333
Lynnway, Shepard Street, and Marine Boulevard	--	--	--	--	--	--	--
Lynnway	NB – Left	27	m55	141	m208	69	m122
Lynnway	NB – Through/right	205	280	35	83	390	m502
Lynnway	SB – Left	57	m71	21	55	45	90
Lynnway	SB – Through/right	35	67	319	381	51	28
Marine Boulevard	WB – Left	7	23	15	38	4	16
Marine Boulevard	WB – Through/right	0	0	4	23	4	20
Shepard Street	EB – Left/through/right	37	77	40	81	35	79
Lynnway and Kingman Street	--	--	--	--	--	--	--
Lynnway	NB – Left	47	92	51	m82	49	107
Lynnway	NB – Through/right	72	127	113	519	8	37
Lynnway	SB – Left	80	m110	63	113	13	m29
Lynnway	SB – Through/right	73	767	47	80	41	84
Kingman Street	WB – Left	35	66	78	124	23	48
Kingman Street	WB – Through/right	0	40	4	55	0	0

Lynnway, Carroll Parkway, and							
Market Street	--	--	--	--	--	--	--
Lynnway	NB – Left	79	119	351	349	66	158
Lynnway	NB – Through	5	8	3	4	11	131
Carroll Parkway	SB – Through	382	469	179	232	224	289
Carroll Parkway	SB – Right	0	48	0	48	0	56
Market Street	EB – Left	71	108	78	111	126	151
Carroll Parkway, Nahant Road, and Lynn Shore Drive							
Carroll Parkway	--	--	--	--	--	--	--
Carroll Parkway	NB – Left	25	50	150	200	25	50
Carroll Parkway	NB – Right	25	50	125	150	125	175
Nahant Road	NB – Left	50	100	50	75	125	175
Nahant Road	NB – Through	25	50	25	50	75	100
Lynn Shore Drive	SB – Through	250	300	50	75	100	125
Lynn Shore Drive	SB – Right	300	450	50	75	125	150
Market Street and Broad Street	--	--	--	--	--	--	--
Market Street	NB – Through/left	45	98	173	218	24	131
Market Street	NB – Right	0	84	260	324	163	260
Market Street	SB – Left/through/right	97	163	162	226	24	
Broad Street	WB – Through/left	203	256	166	219	197	248
Broad Street	WB – Right	15	112	4	138	12	127
Broad Street, Washington Street, and Spring Street							
Broad Street	--	--	--	--	--	--	--
Broad Street	WB – Left/through/right	82	220	50	137	70	195
Broad Street	EB – Through/left	29	77	63	#147	59	#286
Broad Street	EB – Right	0	0	0	63	0	0
Washington Street	NB – Left	77	134	50	137	15	40
Washington Street	NB – Through/right	58	107	82	138	42	87
Washington Street	SB – Left/through/right	50	94	66	115	31	67
Spring Street	SB -- Left/through/right	45	87	72	120	43	85

# **APPENDIX I**

## **Level of Service (LOS) Analysis**

### **Alternative 1**



Lane Group	WBL	WBR	NBT	NBR	SBL	SBT
Lane Configurations	↑ ↘	↑ ↗	↑↑↑ ↗		↑ ↘	↑↑↑
Traffic Volume (vph)	20	15	925	35	150	2210
Future Volume (vph)	20	15	925	35	150	2210
Satd. Flow (prot)	1678	1501	4797	0	1678	4821
Flt Permitted	0.950				0.950	
Satd. Flow (perm)	1678	1501	4797	0	1678	4821
Satd. Flow (RTOR)			16	6		
Lane Group Flow (vph)	21	16	1000	0	156	2302
Turn Type	Prot	Perm	NA		Prot	NA
Protected Phases	8		2		1	6
Permitted Phases			8			
Total Split (s)	35.0	35.0	58.0		27.0	85.0
Total Lost Time (s)	4.0	4.0	4.0		4.0	4.0
Act Efect Green (s)	12.8	12.8	82.8		17.3	105.6
Actuated g/C Ratio	0.11	0.11	0.69		0.14	0.88
v/c Ratio	0.12	0.09	0.30		0.65	0.54
Control Delay	45.5	18.1	10.0		67.8	1.0
Queue Delay	0.0	0.0	0.0		0.0	0.0
Total Delay	45.5	18.1	10.0		67.8	1.0
LOS	D	B	B		E	A
Approach Delay	33.6			10.0		5.2
Approach LOS	C			B		A
Queue Length 50th (ft)	16	0	100		122	0
Queue Length 95th (ft)	33	18	233		166	89
Internal Link Dist (ft)	376		617			1043
Turn Bay Length (ft)					400	
Base Capacity (vph)	433	399	3310		321	4244
Starvation Cap Reductn	0	0	0		0	0
Spillback Cap Reductn	0	0	0		0	0
Storage Cap Reductn	0	0	0		0	0
Reduced v/c Ratio	0.05	0.04	0.30		0.49	0.54

#### Intersection Summary

Cycle Length: 120

Actuated Cycle Length: 120

Offset: 0 (0%), Referenced to phase 2:NBT and 6:SBT, Start of Green, Master Intersection

Control Type: Actuated-Coordinated

Maximum v/c Ratio: 0.65

Intersection Signal Delay: 6.9

Intersection LOS: A

Intersection Capacity Utilization 55.2%

ICU Level of Service B

Analysis Period (min) 15

Splits and Phases: 2: Lynnway & Hanson St



Lane Group	NBL	NBT	NBR	SBL	SBT	SBR	NEL	NET	NER	SWL	SWT	SWR
Lane Configurations	↑	↑			↑	↑	↑	↑↑↑		↑	↑↑↑	
Traffic Volume (vph)	25	0	5	5	0	5	25	900	20	70	2335	15
Future Volume (vph)	25	0	5	5	0	5	25	900	20	70	2335	15
Satd. Flow (prot)	1678	1501	0	0	1678	1501	1678	4807	0	1678	4816	0
Flt Permitted	0.754				0.754		0.950			0.950		
Satd. Flow (perm)	1332	1501	0	0	1332	1501	1678	4807	0	1678	4816	0
Satd. Flow (RTOR)		310				109		4			1	
Lane Group Flow (vph)	26	5	0	0	5	5	26	959	0	73	2448	0
Turn Type	Perm	NA		Perm	NA	Perm	Prot	NA		Prot	NA	
Protected Phases		8			4		5	2		1	6	
Permitted Phases	8				4		4					
Total Split (s)	30.0	30.0		30.0	30.0	30.0	20.0	70.0		20.0	70.0	
Total Lost Time (s)	4.0	4.0			4.0	4.0	4.0	4.0		4.0	4.0	
Act Efect Green (s)	9.9	9.9			9.7	9.7	12.8	94.4		11.7	96.5	
Actuated g/C Ratio	0.08	0.08			0.08	0.08	0.11	0.79		0.10	0.80	
v/c Ratio	0.24	0.01			0.05	0.02	0.15	0.25		0.45	0.63	
Control Delay	55.8	0.0			50.0	0.2	35.9	4.9		70.2	3.1	
Queue Delay	0.0	0.0			0.0	0.0	0.0	0.0		0.0	0.0	
Total Delay	55.8	0.0			50.0	0.2	35.9	4.9		70.2	3.1	
LOS	E	A			D	A	D	A		E	A	
Approach Delay		46.8			25.1			5.7			5.1	
Approach LOS		D			C			A			A	
Queue Length 50th (ft)	19	0			4	0	18	78		59	134	
Queue Length 95th (ft)	48	0			16	0	18	95		m67	138	
Internal Link Dist (ft)		148			94			1043			1847	
Turn Bay Length (ft)							300			300		
Base Capacity (vph)	288	568			288	410	223	3781		223	3871	
Starvation Cap Reductn	0	0			0	0	0	0		0	0	
Spillback Cap Reductn	0	0			0	0	0	0		0	0	
Storage Cap Reductn	0	0			0	0	0	0		0	0	
Reduced v/c Ratio	0.09	0.01			0.02	0.01	0.12	0.25		0.33	0.63	

#### Intersection Summary

Cycle Length: 120

Actuated Cycle Length: 120

Offset: 98 (82%), Referenced to phase 2:NET and 6:SWT, Start of Green

Control Type: Actuated-Coordinated

Maximum v/c Ratio: 0.63

Intersection Signal Delay: 5.7

Intersection LOS: A

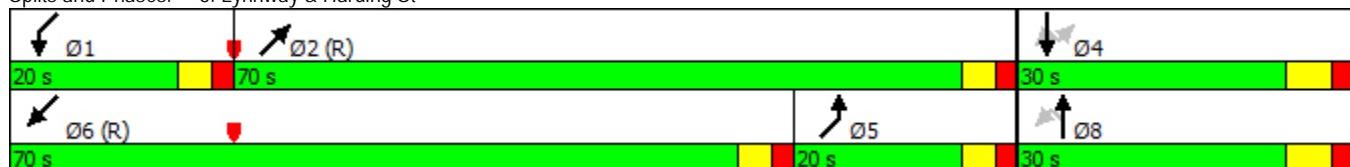
Intersection Capacity Utilization 69.3%

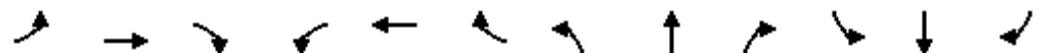
ICU Level of Service C

Analysis Period (min) 15

m Volume for 95th percentile queue is metered by upstream signal.

Splits and Phases: 3: Lynnway & Harding St





Lane Group	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations	↑	↑↑↑			↑↑↑	↑				↑	↑	↑
Traffic Volume (vph)	260	765	10	0	1990	275	0	0	0	245	95	535
Future Volume (vph)	260	765	10	0	1990	275	0	0	0	245	95	535
Satd. Flow (prot)	1678	4812	0	0	4821	1501	0	0	0	1678	1766	1501
Flt Permitted	0.950									0.950		
Satd. Flow (perm)	1678	4812	0	0	4821	1501	0	0	0	1678	1766	1501
Satd. Flow (RTOR)			4			276						9
Lane Group Flow (vph)	271	807	0	0	2073	286	0	0	0	255	99	557
Turn Type	Prot	NA			NA	Perm				Perm	NA	pt+ov
Protected Phases	5	2			6					4	4	5
Permitted Phases					6					4		
Total Split (s)	30.0	90.0			60.0	60.0				30.0	30.0	
Total Lost Time (s)	4.0	4.0			4.0	4.0				4.0	4.0	
Act Efct Green (s)	26.0	88.7			58.7	58.7				23.3	23.3	53.3
Actuated g/C Ratio	0.22	0.74			0.49	0.49				0.19	0.19	0.44
v/c Ratio	0.75	0.23			0.88	0.33				0.78	0.29	0.83
Control Delay	58.1	4.6			14.1	2.2				63.0	42.7	40.6
Queue Delay	0.0	0.0			0.0	0.0				0.0	0.0	0.0
Total Delay	58.1	4.6			14.1	2.2				63.0	42.7	40.6
LOS	E	A			B	A				E	D	D
Approach Delay		18.0			12.7						47.1	
Approach LOS		B			B						D	
Queue Length 50th (ft)	169	102			366	11				184	64	351
Queue Length 95th (ft)	#248	12			463	39				279	115	511
Internal Link Dist (ft)		1847			1063			493			489	
Turn Bay Length (ft)	600					300				200		200
Base Capacity (vph)	363	3559			2359	875				363	382	705
Starvation Cap Reductn	0	0			0	0				0	0	0
Spillback Cap Reductn	0	0			0	0				0	0	0
Storage Cap Reductn	0	0			0	0				0	0	0
Reduced v/c Ratio	0.75	0.23			0.88	0.33				0.70	0.26	0.79

#### Intersection Summary

Cycle Length: 120

Actuated Cycle Length: 120

Offset: 44 (37%), Referenced to phase 2:EBT and 6:WBT, Start of Green

Control Type: Actuated-Coordinated

Maximum v/c Ratio: 0.88

Intersection Signal Delay: 21.2

Intersection LOS: C

Intersection Capacity Utilization 78.2%

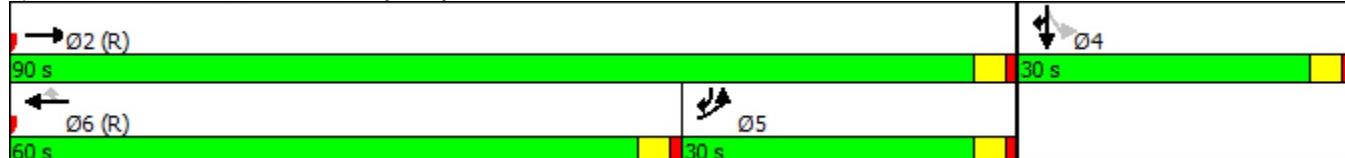
ICU Level of Service D

Analysis Period (min) 15

# 95th percentile volume exceeds capacity, queue may be longer.

Queue shown is maximum after two cycles.

Splits and Phases: 4: Commercial St & Lynnway





Lane Group	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations	↑	↑↑↑		↑	↑↑↑		↑	↑		↑	↑	
Traffic Volume (vph)	50	955	20	70	2215	45	10	0	5	35	10	15
Future Volume (vph)	50	955	20	70	2215	45	10	0	5	35	10	15
Satd. Flow (prot)	1678	4807	0	1678	4807	0	1678	1501	0	0	1656	0
Flt Permitted	0.950				0.950			0.719				0.818
Satd. Flow (perm)	1678	4807	0	1678	4807	0	1270	1501	0	0	1394	0
Satd. Flow (RTOR)		5				4			302			12
Lane Group Flow (vph)	52	1016	0	73	2354	0	10	5	0	0	62	0
Turn Type	Prot	NA		Prot	NA		Perm	NA		Perm	NA	
Protected Phases	5	2		1	6				8			4
Permitted Phases							8				4	
Total Split (s)	20.0	77.0		20.0	77.0		23.0	23.0		23.0	23.0	
Total Lost Time (s)	4.0	4.0		4.0	4.0		4.0	4.0			4.0	
Act Efect Green (s)	10.1	86.8		14.4	90.9		12.6	12.6			12.6	
Actuated g/C Ratio	0.08	0.72		0.12	0.76		0.10	0.10			0.10	
v/c Ratio	0.37	0.29		0.36	0.65		0.08	0.01			0.40	
Control Delay	50.0	13.0		33.7	2.2		47.1	0.0			47.4	
Queue Delay	0.0	0.0		0.0	0.0		0.0	0.0			0.0	
Total Delay	50.0	13.0		33.7	2.2		47.1	0.0			47.4	
LOS	D	B		C	A		D	A			D	
Approach Delay		14.8			3.2			31.4			47.4	
Approach LOS		B			A			C			D	
Queue Length 50th (ft)	41	168		48	31		7	0			37	
Queue Length 95th (ft)	m80	209		m71	54		23	0			77	
Internal Link Dist (ft)		1063			584			95			161	
Turn Bay Length (ft)	250			400								
Base Capacity (vph)	223	3480		223	3640		201	491			230	
Starvation Cap Reductn	0	0		0	0		0	0			0	
Spillback Cap Reductn	0	0		0	0		0	0			0	
Storage Cap Reductn	0	0		0	0		0	0			0	
Reduced v/c Ratio	0.23	0.29		0.33	0.65		0.05	0.01			0.27	

#### Intersection Summary

Cycle Length: 120

Actuated Cycle Length: 120

Offset: 5 (4%), Referenced to phase 2:EBT and 6:WBT, Start of Green

Control Type: Actuated-Coordinated

Maximum v/c Ratio: 0.65

Intersection Signal Delay: 7.5

Intersection LOS: A

Intersection Capacity Utilization 68.0%

ICU Level of Service C

Analysis Period (min) 15

m Volume for 95th percentile queue is metered by upstream signal.

Splits and Phases: 5: Marine Blvd/Sheppard St & Lynnway





Lane Group	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations	↑	↑↑↑		↑	↑↑↑		↑	↑				
Traffic Volume (vph)	55	975	40	95	2240	150	45	5	50	0	0	0
Future Volume (vph)	55	975	40	95	2240	150	45	5	50	0	0	0
Satd. Flow (prot)	1678	4792	0	1678	4778	0	1678	1524	0	0	0	0
Flt Permitted	0.950			0.950			0.950					
Satd. Flow (perm)	1678	4792	0	1678	4778	0	1678	1524	0	0	0	0
Satd. Flow (RTOR)		8			14			52				
Lane Group Flow (vph)	57	1058	0	99	2489	0	47	57	0	0	0	0
Turn Type	Prot	NA		Prot	NA		Split	NA				
Protected Phases	5	2		1	6		8	8				
Permitted Phases												
Total Split (s)	20.0	70.0		20.0	70.0		30.0	30.0				
Total Lost Time (s)	4.0	4.0		4.0	4.0		4.0	4.0				
Act Efect Green (s)	9.7	86.6		12.4	92.3		10.9	10.9				
Actuated g/C Ratio	0.08	0.72		0.10	0.77		0.09	0.09				
v/c Ratio	0.42	0.31		0.58	0.68		0.31	0.31				
Control Delay	60.1	5.9		67.5	6.1		53.5	18.3				
Queue Delay	0.0	0.0		0.0	0.0		0.0	0.0				
Total Delay	60.1	5.9		67.5	6.1		53.5	18.3				
LOS	E	A		E	A		D	B				
Approach Delay		8.7			8.5			34.2				
Approach LOS		A			A			C				
Queue Length 50th (ft)	43	75		80	73		35	4				
Queue Length 95th (ft)	92	90	m114	138			66	40				
Internal Link Dist (ft)		494			544			142				85
Turn Bay Length (ft)				300								
Base Capacity (vph)	223	3461		226	3678		363	370				
Starvation Cap Reductn	0	0		0	0		0	0				
Spillback Cap Reductn	0	0		0	0		0	0				
Storage Cap Reductn	0	0		0	0		0	0				
Reduced v/c Ratio	0.26	0.31		0.44	0.68		0.13	0.15				

#### Intersection Summary

Cycle Length: 120

Actuated Cycle Length: 120

Offset: 110 (92%), Referenced to phase 2:EBT and 6:WBT, Start of Green

Control Type: Actuated-Coordinated

Maximum v/c Ratio: 0.68

Intersection Signal Delay: 9.3

Intersection LOS: A

Intersection Capacity Utilization 65.8%

ICU Level of Service C

Analysis Period (min) 15

m Volume for 95th percentile queue is metered by upstream signal.

Splits and Phases: 6: Kingman St & Lynnway





Lane Group	EBL	EBT	WBT	WBR	SBL	SBR
Lane Configurations	↑↑	↑↑↑	↑↑↑	↑	↑↑	
Traffic Volume (vph)	425	600	1515	200	160	25
Future Volume (vph)	425	600	1515	200	160	25
Satd. Flow (prot)	3255	4821	4821	1501	3220	0
Flt Permitted	0.950				0.959	
Satd. Flow (perm)	3255	4821	4821	1501	3220	0
Satd. Flow (RTOR)				208	15	
Lane Group Flow (vph)	443	625	1578	208	193	0
Turn Type	Prot	NA	NA	Perm	Prot	
Protected Phases	5	2	6		7	
Permitted Phases				6		
Total Split (s)	50.0	80.0	30.0	30.0	40.0	
Total Lost Time (s)	4.0	4.0	4.0	4.0	4.0	
Act Efct Green (s)	46.0	100.0	50.0	50.0	12.0	
Actuated g/C Ratio	0.38	0.83	0.42	0.42	0.10	
v/c Ratio	0.36	0.16	0.79	0.28	0.57	
Control Delay	17.2	0.4	34.3	4.2	55.2	
Queue Delay	0.0	0.0	0.0	0.0	0.0	
Total Delay	17.2	0.4	34.3	4.2	55.2	
LOS	B	A	C	A	E	
Approach Delay		7.3	30.8		55.2	
Approach LOS		A	C		E	
Queue Length 50th (ft)	134	2	382	0	70	
Queue Length 95th (ft)	97	7	469	48	105	
Internal Link Dist (ft)		431	1038		315	
Turn Bay Length (ft)			600			
Base Capacity (vph)	1247	4016	2008	746	976	
Starvation Cap Reductn	0	0	0	0	0	
Spillback Cap Reductn	0	0	0	0	0	
Storage Cap Reductn	0	0	0	0	0	
Reduced v/c Ratio	0.36	0.16	0.79	0.28	0.20	

#### Intersection Summary

Cycle Length: 120

Actuated Cycle Length: 120

Offset: 2 (2%), Referenced to phase 2:EBT and 6:WBT, Start of Green

Control Type: Actuated-Coordinated

Maximum v/c Ratio: 0.79

Intersection Signal Delay: 24.1

Intersection LOS: C

Intersection Capacity Utilization 57.2%

ICU Level of Service B

Analysis Period (min) 15

Splits and Phases: 7: Lynnway/Carroll Parkway & Market St





Lane Group	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Traffic Volume (vph)	0	0	0	53	500	180	10	305	310	155	135	160
Future Volume (vph)	0	0	0	53	500	180	10	305	310	155	135	160
Satd. Flow (prot)	0	0	0	0	3339	1501	0	3349	1501	0	3124	0
Flt Permitted					0.995			0.939			0.706	
Satd. Flow (perm)	0	0	0	0	3339	1501	0	3151	1501	0	2243	0
Satd. Flow (RTOR)						188			323		102	
Lane Group Flow (vph)	0	0	0	0	576	188	0	328	323	0	469	0
Turn Type					Split	NA	Perm	Perm	NA	pt+ov	Perm	NA
Protected Phases					3	3			2	2 3		6
Permitted Phases							3	2			6	
Total Split (s)					43.0	43.0	50.0	50.0		50.0	50.0	
Total Lost Time (s)						4.0	4.0		4.0		4.0	
Act Effct Green (s)						30.0	30.0	65.8	101.4		65.8	
Actuated g/C Ratio						0.25	0.25	0.55	0.84		0.55	
v/c Ratio						0.69	0.36	0.19	0.25		0.37	
Control Delay						39.9	11.1	7.6	1.1		16.3	
Queue Delay						0.0	0.0	0.0	0.2		0.0	
Total Delay						39.9	11.1	7.6	1.2		16.3	
LOS						D	B	A	A		B	
Approach Delay						32.8			4.4		16.3	
Approach LOS						C		A			B	
Queue Length 50th (ft)						196	15	27	12		97	
Queue Length 95th (ft)						248	109	50	22		163	
Internal Link Dist (ft)		27				626			315		249	
Turn Bay Length (ft)							150					
Base Capacity (vph)						1085	614	1727	1347		1275	
Starvation Cap Reductn						0	0	0	408		0	
Spillback Cap Reductn						0	0	0	0		0	
Storage Cap Reductn						0	0	0	0		0	
Reduced v/c Ratio						0.53	0.31	0.19	0.34		0.37	

#### Intersection Summary

Cycle Length: 120

Actuated Cycle Length: 120

Offset: 33 (28%), Referenced to phase 2:NBT and 6:SBTL, Start of Green

Control Type: Actuated-Coordinated

Maximum v/c Ratio: 0.69

Intersection Signal Delay: 18.9

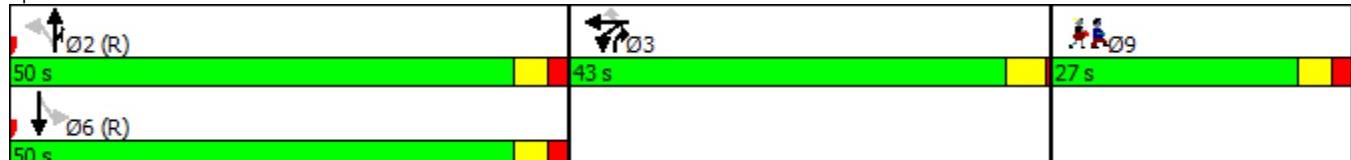
Intersection LOS: B

Intersection Capacity Utilization 47.5%

ICU Level of Service A

Analysis Period (min) 15

Splits and Phases: 9: Market St & Broad St





Lane Group	EBL	EBT	EBR	WBL	WBT	WBR2	NBL2	NBL	NBT	NBR	SBL	SBT
Lane Configurations												
Traffic Volume (vph)	50	220	205	35	580	30	100	0	70	15	20	20
Future Volume (vph)	50	220	205	35	580	30	100	0	70	15	20	20
Satd. Flow (prot)	0	1750	1501	0	3322	0	0	1678	1718	0	0	1660
Flt Permitted		0.806			0.921			0.702				0.880
Satd. Flow (perm)	0	1423	1501	0	3069	0	0	1240	1718	0	0	1484
Satd. Flow (RTOR)			214		136				8			
Lane Group Flow (vph)	0	281	214	0	671	0	0	104	89	0	0	63
Turn Type	Perm	NA	Perm	Perm	NA		Perm	Perm	NA		custom	NA
Protected Phases		2			6				8			
Permitted Phases	2		2	6				8	8		4	4
Total Split (s)	50.0	50.0	50.0	50.0	50.0			24.0	24.0		24.0	24.0
Total Lost Time (s)		4.0	4.0		4.0			4.0	4.0			4.0
Act Efct Green (s)	75.5	75.5		75.5				15.5	15.5			15.5
Actuated g/C Ratio	0.63	0.63		0.63				0.13	0.13			0.13
v/c Ratio	0.31	0.21		0.34				0.65	0.39			0.33
Control Delay	7.4	0.6		11.2				67.5	47.3			50.7
Queue Delay	0.0	0.0		0.0				0.0	0.0			0.0
Total Delay	7.4	0.6		11.2				67.5	47.3			50.7
LOS	A	A		B				E	D			D
Approach Delay	4.4			11.2					58.2			50.7
Approach LOS	A			B					E			D
Queue Length 50th (ft)	37	0		82				77	58			45
Queue Length 95th (ft)	85	0		220				134	107			87
Internal Link Dist (ft)	626			404					1111			214
Turn Bay Length (ft)								150				
Base Capacity (vph)	894	1023		1980				206	293			247
Starvation Cap Reductn	0	0		0				0	0			0
Spillback Cap Reductn	0	0		0				0	0			0
Storage Cap Reductn	0	0		0				0	0			0
Reduced v/c Ratio	0.31	0.21		0.34				0.50	0.30			0.26

#### Intersection Summary

Cycle Length: 120

Actuated Cycle Length: 120

Offset: 40 (33%), Referenced to phase 2:EBTL and 6:WBT, Start of Green

Control Type: Actuated-Coordinated

Maximum v/c Ratio: 0.65

Intersection Signal Delay: 18.6

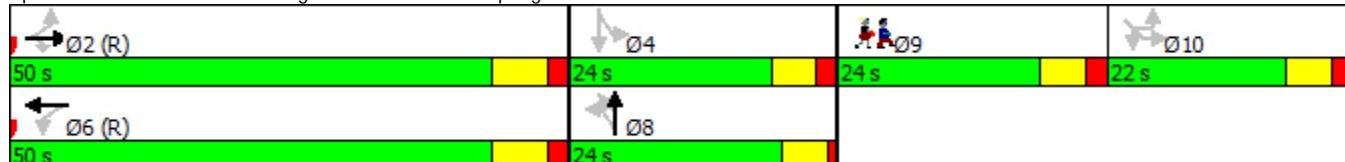
Intersection LOS: B

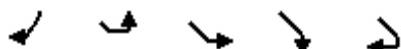
Intersection Capacity Utilization 67.2%

ICU Level of Service C

Analysis Period (min) 15

Splits and Phases: 10: Washington St & Broad St & Spring St





Lane Group	SBR	SEL2	SEL	SER	SER2	Ø9
Lane Configurations			2	2		
Traffic Volume (vph)	20	5	60	120	30	
Future Volume (vph)	20	5	60	120	30	
Satd. Flow (prot)	0	0	1678	1501	0	
Flt Permitted			0.950			
Satd. Flow (perm)	0	0	1678	1501	0	
Satd. Flow (RTOR)			145			
Lane Group Flow (vph)	0	0	68	156	0	
Turn Type		Perm	Perm	Perm		
Protected Phases					9	
Permitted Phases		10	10	10		
Total Split (s)	22.0	22.0	22.0		24.0	
Total Lost Time (s)		4.0	4.0			
Act Efct Green (s)		12.2	12.2			
Actuated g/C Ratio		0.10	0.10			
v/c Ratio		0.40	0.55			
Control Delay		56.5	17.3			
Queue Delay		0.0	0.0			
Total Delay		56.5	17.3			
LOS		E	B			
Approach Delay		29.2				
Approach LOS		C				
Queue Length 50th (ft)		50	8			
Queue Length 95th (ft)		94	71			
Internal Link Dist (ft)		258				
Turn Bay Length (ft)		150				
Base Capacity (vph)		251	348			
Starvation Cap Reductn		0	0			
Spillback Cap Reductn		0	0			
Storage Cap Reductn		0	0			
Reduced v/c Ratio		0.27	0.45			
Intersection Summary						

Intersection							
Approach	WB		SB		NE		
Entry Lanes		2		2		2	
Conflicting Circle Lanes		2		2		2	
Adj Approach Flow, veh/h	1531		791		521		
Demand Flow Rate, veh/h	1592		822		542		
Vehicles Circulating, veh/h	390		76		687		
Vehicles Exiting, veh/h	839		1906		76		
Follow-Up Headway, s	3.186		3.186		3.186		
Ped Vol Crossing Leg, #/h	0		0		0		
Ped Cap Adj	1.000		1.000		1.000		
Approach Delay, s/veh	41.4		6.4		13.6		
Approach LOS	E		A		B		
Lane	Left	Right	Left	Right	Bypass	Left	Right
Designated Moves	LTR	R	L	LTR	R	L	TR
Assumed Moves	LTR	R	L	LTR	R	L	TR
RT Channelized					Yield		
Lane Util	0.470	0.530	0.530	0.470		0.720	0.280
Critical Headway, s	4.293	4.113	4.293	4.113		4.293	4.113
Entry Flow, veh/h	748	844	364	323	135	390	152
Cap Entry Lane, veh/h	843	860	1067	1071	1071	675	699
Entry HV Adj Factor	0.962	0.961	0.962	0.962	0.962	0.962	0.961
Flow Entry, veh/h	720	811	350	311	130	375	146
Cap Entry, veh/h	811	827	1027	1031	1030	649	671
V/C Ratio	0.887	0.981	0.341	0.301	0.126	0.578	0.218
Control Delay, s/veh	32.6	49.1	7.0	6.5	4.6	15.7	7.9
LOS	D	E	A	A	A	C	A
95th %tile Queue, veh	12	17	2	1	0	4	1





Lane Group	WBL	WBR	NBT	NBR	SBL	SBT
Lane Configurations	↑ ↗	↗ ↗	↑↑↑		↗	↑↑↑
Traffic Volume (vph)	75	100	2140	50	225	1065
Future Volume (vph)	75	100	2140	50	225	1065
Satd. Flow (prot)	1711	1531	4901	0	1711	4916
Flt Permitted	0.950				0.950	
Satd. Flow (perm)	1711	1531	4901	0	1711	4916
Satd. Flow (RTOR)			104	4		
Lane Group Flow (vph)	78	104	2281	0	234	1109
Turn Type	Prot	Perm	NA		Prot	NA
Protected Phases	8		2		1	6
Permitted Phases			8			
Total Split (s)	35.0	35.0	62.0		23.0	85.0
Total Lost Time (s)	5.0	5.0	5.0		5.0	4.0
Act Effct Green (s)	13.9	13.9	73.1		18.0	97.1
Actuated g/C Ratio	0.12	0.12	0.61		0.15	0.81
v/c Ratio	0.40	0.39	0.76		0.91	0.28
Control Delay	52.3	11.8	20.0		68.7	0.9
Queue Delay	0.0	0.0	0.0		0.0	0.0
Total Delay	52.3	11.8	20.1		68.7	0.9
LOS	D	B	C		E	A
Approach Delay	29.2			20.1		12.7
Approach LOS	C			C		B
Queue Length 50th (ft)	59	0	409		188	9
Queue Length 95th (ft)	90	44	#753		#338	22
Internal Link Dist (ft)	376		617			1043
Turn Bay Length (ft)					400	
Base Capacity (vph)	427	460	2987		256	3977
Starvation Cap Reductn	0	0	44		0	0
Spillback Cap Reductn	0	0	0		0	0
Storage Cap Reductn	0	0	0		0	0
Reduced v/c Ratio	0.18	0.23	0.78		0.91	0.28

#### Intersection Summary

Cycle Length: 120

Actuated Cycle Length: 120

Offset: 0 (0%), Referenced to phase 2:NBT and 6:SBT, Start of Green, Master Intersection

Control Type: Actuated-Coordinated

Maximum v/c Ratio: 0.91

Intersection Signal Delay: 17.9

Intersection LOS: B

Intersection Capacity Utilization 73.3%

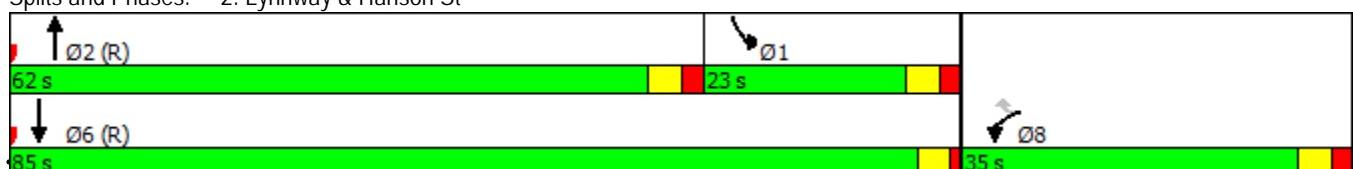
ICU Level of Service D

Analysis Period (min) 15

# 95th percentile volume exceeds capacity, queue may be longer.

Queue shown is maximum after two cycles.

Splits and Phases: 2: Lynnway & Hanson St



Lynnway-Route 1A-Carroll Parkway Study  
3: Lynnway & Harding St

2015 ALT1 PM

5:00 pm

Lane Group	NBL	NBT	NBR	SBL	SBT	SBR	NEL	NET	NER	SWL	SWT	SWR
Lane Configurations												
Traffic Volume (vph)	40	0	40	30	0	5	45	2230	65	165	1195	65
Future Volume (vph)	40	0	40	30	0	5	45	2230	65	165	1195	65
Satd. Flow (prot)	1711	1531	0	0	1711	1531	1711	4896	0	1711	4876	0
Flt Permitted	0.737				0.730			0.950			0.950	
Satd. Flow (perm)	1327	1531	0	0	1314	1531	1711	4896	0	1711	4876	0
Satd. Flow (RTOR)		207				64		6			11	
Lane Group Flow (vph)	42	42	0	0	31	5	47	2391	0	172	1313	0
Turn Type	Perm	NA		Perm	NA	Perm	Prot	NA		Prot	NA	
Protected Phases		8				4		5	2		1	6
Permitted Phases	8				4		4					
Total Split (s)	30.0	30.0		30.0	30.0	30.0	20.0	70.0		20.0	70.0	
Total Lost Time (s)	6.0	6.0			6.0	6.0	5.0	5.0		5.0	5.0	
Act Effct Green (s)	9.3	9.3			9.3	9.3	13.4	82.6		14.4	87.0	
Actuated g/C Ratio	0.08	0.08			0.08	0.08	0.11	0.69		0.12	0.72	
v/c Ratio	0.41	0.14			0.31	0.03	0.25	0.71		0.84	0.37	
Control Delay	63.6	0.9			58.9	0.2	33.2	9.0		69.6	2.3	
Queue Delay	0.0	0.0			0.0	0.0	0.0	0.0		0.0	0.0	
Total Delay	63.6	0.9			58.9	0.2	33.2	9.0		69.6	2.3	
LOS	E	A			E	A	C	A		E	A	
Approach Delay		32.3			50.7			9.5			10.1	
Approach LOS		C			D			A			B	
Queue Length 50th (ft)	32	0			23	0	34	116		141	30	
Queue Length 95th (ft)	68	0			54	0	m41	267		m#213	48	
Internal Link Dist (ft)		148			94			1043			1865	
Turn Bay Length (ft)							300			300		
Base Capacity (vph)	265	471		262	357	213	3371			213	3539	
Starvation Cap Reductn	0	0			0	0	0	0		0	0	
Spillback Cap Reductn	0	0			0	0	0	0		0	0	
Storage Cap Reductn	0	0			0	0	0	0		0	0	
Reduced v/c Ratio	0.16	0.09			0.12	0.01	0.22	0.71		0.81	0.37	

Intersection Summary

Cycle Length: 120

Actuated Cycle Length: 120

Offset: 117 (98%), Referenced to phase 2:NET and 6:SWT, Start of Green

Control Type: Actuated-Coordinated

Maximum v/c Ratio: 0.84

Intersection Signal Delay: 10.5

Intersection LOS: B

Intersection Capacity Utilization 75.9%

ICU Level of Service D

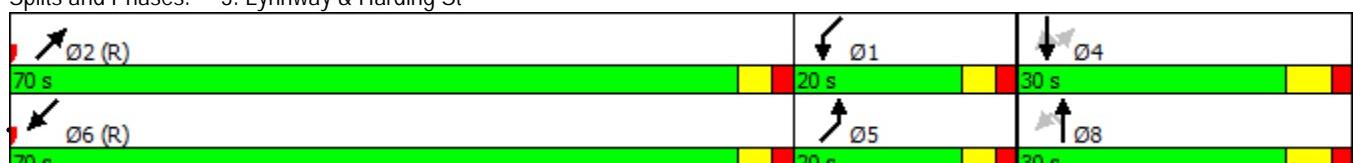
Analysis Period (min) 15

# 95th percentile volume exceeds capacity, queue may be longer.

Queue shown is maximum after two cycles.

m Volume for 95th percentile queue is metered by upstream signal.

Splits and Phases: 3: Lynnway & Harding St



## 4: Commercial St &amp; Lynnway



Lane Group	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations	↑	↑↑↑			↑↑↑	↑				↑	↑	↑
Traffic Volume (vph)	540	1950	5	0	1095	295	0	0	0	340	25	285
Future Volume (vph)	540	1950	5	0	1095	295	0	0	0	340	25	285
Satd. Flow (prot)	1711	4916	0	0	4916	1531	0	0	0	1711	1801	1531
Flt Permitted	0.950									0.950		
Satd. Flow (perm)	1711	4916	0	0	4916	1531	0	0	0	1711	1801	1531
Satd. Flow (RTOR)			1			307						9
Lane Group Flow (vph)	563	2036	0	0	1141	307	0	0	0	354	26	297
Turn Type	Prot	NA			NA	Perm				Perm	NA	pt+ov
Protected Phases	5	2			6					4	4	5
Permitted Phases					6					4		
Total Split (s)	50.0	86.0			36.0	36.0				34.0	34.0	
Total Lost Time (s)	4.0	4.0			4.0	4.0				4.0	4.0	
Act Effct Green (s)	43.0	84.0			37.0	37.0				28.0	28.0	75.0
Actuated g/C Ratio	0.36	0.70			0.31	0.31				0.23	0.23	0.62
v/c Ratio	0.92	0.59			0.75	0.45				0.89	0.06	0.31
Control Delay	38.4	12.8			27.5	5.5				69.0	35.0	10.4
Queue Delay	0.0	0.0			0.0	0.0				0.0	0.0	0.0
Total Delay	38.4	12.8			27.5	5.5				69.0	35.0	10.4
LOS	D	B			C	A				E	C	B
Approach Delay		18.4			22.8						42.0	
Approach LOS		B			C						D	
Queue Length 50th (ft)	386	528			198	37				261	15	84
Queue Length 95th (ft)	#584	482			255	55				#416	39	128
Internal Link Dist (ft)		1865			1085			493			489	
Turn Bay Length (ft)	600				300					200		200
Base Capacity (vph)	655	3443			1516	684				427	450	992
Starvation Cap Reductn	0	0			0	0				0	0	0
Spillback Cap Reductn	0	0			0	0				0	0	0
Storage Cap Reductn	0	0			0	0				0	0	0
Reduced v/c Ratio	0.86	0.59			0.75	0.45				0.83	0.06	0.30

## Intersection Summary

Cycle Length: 120

Actuated Cycle Length: 120

Offset: 100 (83%), Referenced to phase 2:EBT and 6:WBT, Start of Green

Control Type: Actuated-Coordinated

Maximum v/c Ratio: 0.92

Intersection Signal Delay: 23.1

Intersection LOS: C

Intersection Capacity Utilization 79.9%

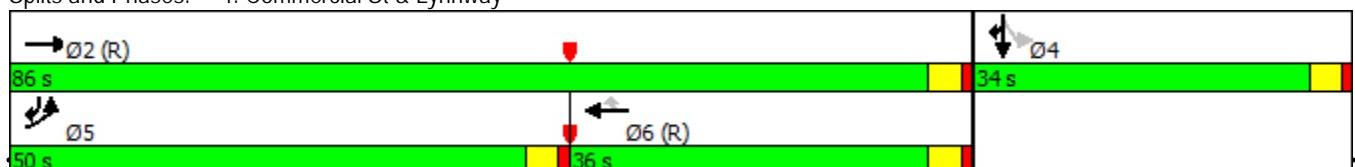
ICU Level of Service D

Analysis Period (min) 15

# 95th percentile volume exceeds capacity, queue may be longer.

Queue shown is maximum after two cycles.

Splits and Phases: 4: Commercial St &amp; Lynnway



Lynnway-Route 1A-Carroll Parkway Study  
5: Marine Blvd/Sheppard St & Lynnway

2015 ALT1 PM

5:00 pm

Lane Group	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations	↑	↑↑↓		↑	↑↑↓		↑	↑			↔	
Traffic Volume (vph)	175	2105	20	35	1345	20	20	5	10	40	5	25
Future Volume (vph)	175	2105	20	35	1345	20	20	5	10	40	5	25
Satd. Flow (prot)	1711	4911	0	1711	4906	0	1711	1621	0	0	1666	0
Flt Permitted	0.950			0.950			0.739				0.814	
Satd. Flow (perm)	1711	4911	0	1711	4906	0	1331	1621	0	0	1395	0
Satd. Flow (RTOR)		2			2			10			20	
Lane Group Flow (vph)	182	2214	0	36	1422	0	21	15	0	0	73	0
Turn Type	Prot	NA		Prot	NA		Perm	NA		Perm	NA	
Protected Phases	5	2		1	6				8			4
Permitted Phases							8				4	
Total Split (s)	29.0	80.0		13.0	64.0		27.0	27.0		27.0	27.0	
Total Lost Time (s)	6.0	6.0		6.0	6.0		6.0	6.0			6.0	
Act Effct Green (s)	17.7	91.9		7.6	75.4		11.5	11.5			11.5	
Actuated g/C Ratio	0.15	0.77		0.06	0.63		0.10	0.10			0.10	
v/c Ratio	0.73	0.59		0.33	0.46		0.17	0.09			0.48	
Control Delay	73.0	1.6		60.5	6.6		49.8	28.4			47.0	
Queue Delay	0.0	0.0		0.0	0.0		0.0	0.0			0.0	
Total Delay	73.0	1.6		60.5	6.6		49.8	28.4			47.0	
LOS	E	A		E	A		D	C			D	
Approach Delay		7.0			7.9			40.8			47.0	
Approach LOS		A			A			D			D	
Queue Length 50th (ft)	144	20		29	73		15	4			40	
Queue Length 95th (ft)	m208	89		67	119		38	23			81	
Internal Link Dist (ft)		1085			554			123			133	
Turn Bay Length (ft)	250			400								
Base Capacity (vph)	327	3760		108	3083		232	291			260	
Starvation Cap Reductn	0	0		0	0		0	0			0	
Spillback Cap Reductn	0	0		0	0		0	0			0	
Storage Cap Reductn	0	0		0	0		0	0			0	
Reduced v/c Ratio	0.56	0.59		0.33	0.46		0.09	0.05			0.28	

#### Intersection Summary

Cycle Length: 120

Actuated Cycle Length: 120

Offset: 69 (58%), Referenced to phase 2:EBT and 6:WBT, Start of Green

Control Type: Actuated-Coordinated

Maximum v/c Ratio: 0.73

Intersection Signal Delay: 8.4

Intersection LOS: A

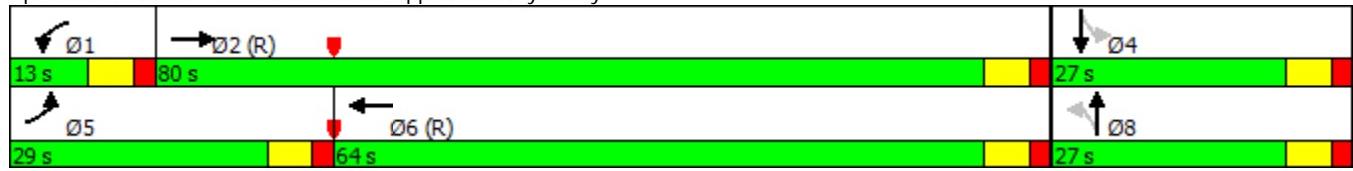
Intersection Capacity Utilization 72.6%

ICU Level of Service C

Analysis Period (min) 15

m Volume for 95th percentile queue is metered by upstream signal.

Splits and Phases: 5: Marine Blvd/Sheppard St & Lynnway



Lynnway-Route 1A-Carroll Parkway Study  
6: Kingman St & Lynnway

2015 ALT1 PM

5:00 pm

	↑	→	↓	↖	←	↗	↙	↑	↗	↖	↓	↙
Lane Group	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations	↑	↑↑↑		↑	↑↑↑		↑	↑				
Traffic Volume (vph)	65	2185	35	75	1290	40	100	5	115	0	0	0
Future Volume (vph)	65	2185	35	75	1290	40	100	5	115	0	0	0
Satd. Flow (prot)	1711	4906	0	1711	4891	0	1711	1541	0	0	0	0
Flt Permitted	0.950			0.950			0.950					
Satd. Flow (perm)	1711	4906	0	1711	4891	0	1711	1541	0	0	0	0
Satd. Flow (RTOR)			3			6			120			
Lane Group Flow (vph)	68	2312	0	78	1386	0	104	125	0	0	0	0
Turn Type	Prot	NA		Prot	NA		Split	NA				
Protected Phases	5	2		1	6		8	8				
Permitted Phases												
Total Split (s)	20.0	70.0		20.0	70.0		30.0	30.0				
Total Lost Time (s)	4.0	4.0		4.0	4.0		4.0	4.0				
Act Effct Green (s)	10.9	85.6		10.9	85.6		13.7	13.7				
Actuated g/C Ratio	0.09	0.71		0.09	0.71		0.11	0.11				
v/c Ratio	0.44	0.66		0.51	0.40		0.53	0.44				
Control Delay	38.8	7.9		66.8	3.4		58.8	13.8				
Queue Delay	0.0	0.0		0.0	0.0		0.0	0.0				
Total Delay	38.8	7.9		66.8	3.4		58.8	13.8				
LOS	D	A		E	A		E	B				
Approach Delay		8.8			6.8			34.2				
Approach LOS		A			A			C				
Queue Length 50th (ft)	49	140		63	48		78	4				
Queue Length 95th (ft)	m80	208		113	87		124	55				
Internal Link Dist (ft)		494			544			258				85
Turn Bay Length (ft)			300									
Base Capacity (vph)	228	3502		228	3492		370	427				
Starvation Cap Reductn	0	0		0	0		0	0				
Spillback Cap Reductn	0	0		0	0		0	0				
Storage Cap Reductn	0	0		0	0		0	0				
Reduced v/c Ratio	0.30	0.66		0.34	0.40		0.28	0.29				

Intersection Summary

Cycle Length: 120

Actuated Cycle Length: 120

Offset: 68 (57%), Referenced to phase 2:EBT and 6:WBT, Start of Green

Control Type: Actuated-Coordinated

Maximum v/c Ratio: 0.66

Intersection Signal Delay: 9.5

Intersection LOS: A

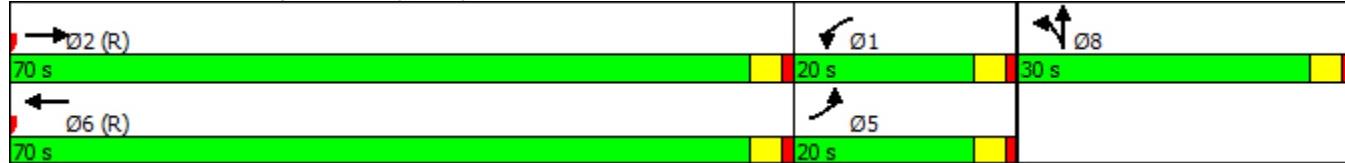
Intersection Capacity Utilization 66.2%

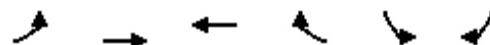
ICU Level of Service C

Analysis Period (min) 15

m Volume for 95th percentile queue is metered by upstream signal.

Splits and Phases: 6: Kingman St & Lynnway





Lane Group	EBL	EBT	WBT	WBR	SBL	SBR
Lane Configurations	↑↑	↑↑↑	↑↑↑	↑	↑↑	
Traffic Volume (vph)	815	1450	805	165	215	15
Future Volume (vph)	815	1450	805	165	215	15
Satd. Flow (prot)	3319	4916	4916	1531	3303	0
Flt Permitted	0.950				0.955	
Satd. Flow (perm)	3319	4916	4916	1531	3303	0
Satd. Flow (RTOR)				172	6	
Lane Group Flow (vph)	849	1510	839	172	240	0
Turn Type	Prot	NA	NA	Perm	Prot	
Protected Phases	5	2	6		7	
Permitted Phases				6		
Total Split (s)	54.0	92.0	38.0	38.0	28.0	
Total Lost Time (s)	5.0	4.0	4.0	4.0	4.0	
Act Effct Green (s)	49.0	98.2	44.2	44.2	13.8	
Actuated g/C Ratio	0.41	0.82	0.37	0.37	0.12	
v/c Ratio	0.63	0.38	0.46	0.26	0.62	
Control Delay	21.3	3.3	30.3	5.1	54.2	
Queue Delay	0.0	0.0	0.0	0.0	0.0	
Total Delay	21.3	3.3	30.3	5.1	54.2	
LOS	C	A	C	A	D	
Approach Delay		9.8	26.0		54.2	
Approach LOS		A	C		D	
Queue Length 50th (ft)	207	83	179	0	92	
Queue Length 95th (ft)	226	79	232	48	135	
Internal Link Dist (ft)		429	1170		327	
Turn Bay Length (ft)			600			
Base Capacity (vph)	1355	4022	1810	672	665	
Starvation Cap Reductn	0	0	0	0	0	
Spillback Cap Reductn	0	0	0	0	0	
Storage Cap Reductn	0	0	0	0	0	
Reduced v/c Ratio	0.63	0.38	0.46	0.26	0.36	

#### Intersection Summary

Cycle Length: 120

Actuated Cycle Length: 120

Offset: 57 (48%), Referenced to phase 2:EBT and 6:WBT, Start of Green

Control Type: Actuated-Coordinated

Maximum v/c Ratio: 0.63

Intersection Signal Delay: 17.3

Intersection LOS: B

Intersection Capacity Utilization 56.2%

ICU Level of Service B

Analysis Period (min) 15

Splits and Phases: 7: Lynnway/Carroll Parkway & Market St



Lynnway-Route 1A-Carroll Parkway Study  
9: Broad St & Market St

2015 ALT1 PM  
5:00 pm



Lane Group	WBL2	WBL	WBR	NBL	NBT	NBR	SBL	SBT	SBR	NEL	NER	Ø9
Lane Configurations												
Traffic Volume (vph)	50	335	205	15	395	570	290	175	160	0	0	
Future Volume (vph)	50	335	205	15	395	570	290	175	160	0	0	
Satd. Flow (prot)	0	3319	1531	0	3414	1531	0	3216	0	0	0	
Flt Permitted		0.950			0.922			0.639				
Satd. Flow (perm)	0	3319	1531	0	3154	1531	0	2103	0	0	0	
Satd. Flow (RTOR)			214			594		58				
Lane Group Flow (vph)	0	401	214	0	427	594	0	651	0	0	0	
Turn Type	Prot	Prot	Perm	Perm	NA	pt+ov	Perm	NA				
Protected Phases	8	8			2	28		6				9
Permitted Phases			8	2			6					
Total Split (s)	27.0	27.0	27.0	66.0	66.0		66.0	66.0				27.0
Total Lost Time (s)		5.0	5.0		5.0			5.0				
Act Effct Green (s)	20.1	20.1		73.7	100.8		73.7					
Actuated g/C Ratio	0.17	0.17		0.61	0.84		0.61					
v/c Ratio	0.72	0.49		0.22	0.43		0.50					
Control Delay	48.2	11.5		2.5	3.2		16.1					
Queue Delay	0.0	0.0		0.0	0.5		0.0					
Total Delay	48.2	11.5		2.5	3.7		16.1					
LOS	D	B		A	A		B					
Approach Delay	35.4			3.2			16.1					
Approach LOS	D			A			B					
Queue Length 50th (ft)	124	0		14	63		162					
Queue Length 95th (ft)	185	93		25	129		226					
Internal Link Dist (ft)	246			327			471		2			
Turn Bay Length (ft)												
Base Capacity (vph)	608	455		1937	1378		1314					
Starvation Cap Reductn	0	0		0	398		0					
Spillback Cap Reductn	0	0		0	0		0					
Storage Cap Reductn	0	0		0	0		0					
Reduced v/c Ratio	0.66	0.47		0.22	0.61		0.50					

#### Intersection Summary

Cycle Length: 120

Actuated Cycle Length: 120

Offset: 95 (79%), Referenced to phase 2:NBTL and 6:SBTL, Start of Green

Control Type: Actuated-Coordinated

Maximum v/c Ratio: 0.72

Intersection Signal Delay: 15.5

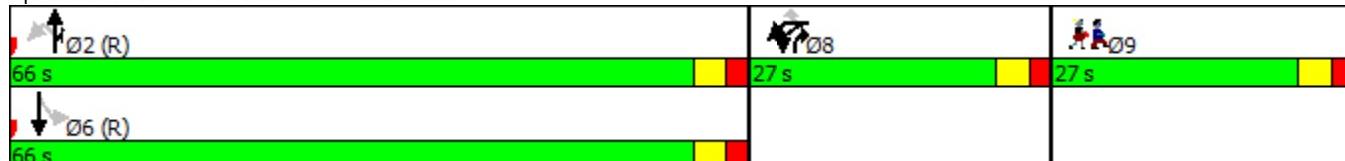
Intersection LOS: B

Intersection Capacity Utilization 62.0%

ICU Level of Service B

Analysis Period (min) 15

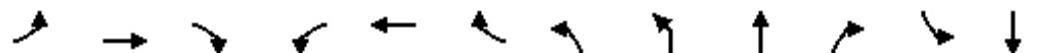
Splits and Phases: 9: Broad St & Market St



Lynnway-Route 1A-Carroll Parkway Study  
10: Washington St & Broad St & Spring St

2015 ALT1 PM

5:00 pm



Lane Group	EBL	EBT	EBR	WBL	WBT	WBR2	NBL2	NBL	NBT	NBR	SBL	SBT
Lane Configurations												
Traffic Volume (vph)	15	415	405	20	375	5	105	0	75	25	5	20
Future Volume (vph)	15	415	405	20	375	5	105	0	75	25	5	20
Satd. Flow (prot)	0	1797	1531	0	3404	0	0	1711	1732	0	0	1616
Flt Permitted		0.978			0.918			0.625				0.984
Satd. Flow (perm)	0	1761	1531	0	3134	0	0	1125	1732	0	0	1595
Satd. Flow (RTOR)			422		127				12			
Lane Group Flow (vph)	0	448	422	0	417	0	0	109	104	0	0	99
Turn Type	Perm	NA	Perm	Perm	NA		Perm	Perm	NA		Perm	NA
Protected Phases		2			6				8			4
Permitted Phases	2		2	6			8	8			4	
Total Split (s)	44.0	44.0	44.0	44.0	44.0		30.0	30.0	30.0	30.0	30.0	30.0
Total Lost Time (s)		7.0	7.0		7.0			6.0	6.0			6.0
Act Effct Green (s)	66.7	66.7		66.7			16.0	16.0				16.0
Actuated g/C Ratio	0.56	0.56		0.56			0.13	0.13				0.13
v/c Ratio	0.46	0.41		0.23			0.73	0.43				0.46
Control Delay	16.1	2.5		12.5			75.2	46.2				53.7
Queue Delay	0.0	0.0		0.0			0.0	0.0				0.0
Total Delay	16.1	2.5		12.5			75.2	46.2				53.7
LOS	B	A		B			E	D				D
Approach Delay	9.5			12.5				61.1				53.7
Approach LOS	A			B			E					D
Queue Length 50th (ft)	79	0		50			82	66				72
Queue Length 95th (ft)	#481	65		137			138	115				120
Internal Link Dist (ft)	389			409				413				214
Turn Bay Length (ft)							150					
Base Capacity (vph)	978	1038		1797			225	356				319
Starvation Cap Reductn	0	0		0			0	0				0
Spillback Cap Reductn	0	0		0			0	0				0
Storage Cap Reductn	0	0		0			0	0				0
Reduced v/c Ratio	0.46	0.41		0.23			0.48	0.29				0.31

#### Intersection Summary

Cycle Length: 120

Actuated Cycle Length: 120

Offset: 115 (96%), Referenced to phase 2:EBTL and 6:WBTL, Start of Green

Control Type: Actuated-Coordinated

Maximum v/c Ratio: 0.73

Intersection Signal Delay: 22.4

Intersection LOS: C

Intersection Capacity Utilization 72.6%

ICU Level of Service C

Analysis Period (min) 15

# 95th percentile volume exceeds capacity, queue may be longer.

Queue shown is maximum after two cycles.

Splits and Phases: 10: Washington St & Broad St & Spring St





Lane Group	SBR	SEL2	SEL	SER	SER2	Ø9
Lane Configurations						
Traffic Volume (vph)	70	15	105	100	30	
Future Volume (vph)	70	15	105	100	30	
Satd. Flow (prot)	0	0	1711	1531	0	
Flt Permitted			0.950			
Satd. Flow (perm)	0	0	1711	1531	0	
Satd. Flow (RTOR)				136		
Lane Group Flow (vph)	0	0	125	135	0	
Turn Type		Prot	Prot	Prot		
Protected Phases		10	10	10		9
Permitted Phases						
Total Split (s)		23.0	23.0	23.0		23.0
Total Lost Time (s)			6.0	6.0		
Act Effct Green (s)			13.7	13.7		
Actuated g/C Ratio			0.11	0.11		
v/c Ratio			0.64	0.46		
Control Delay			65.3	12.8		
Queue Delay			0.0	0.0		
Total Delay			65.3	12.8		
LOS		E	B			
Approach Delay			38.0			
Approach LOS			D			
Queue Length 50th (ft)			94	0		
Queue Length 95th (ft)			154	56		
Internal Link Dist (ft)			258			
Turn Bay Length (ft)			150			
Base Capacity (vph)			245	335		
Starvation Cap Reductn			0	0		
Spillback Cap Reductn			0	0		
Storage Cap Reductn			0	0		
Reduced v/c Ratio			0.51	0.40		

#### Intersection Summary

Intersection

Intersection Delay, s/veh 15.2

Intersection LOS C

Approach	WB	SB	NE
Entry Lanes	2	2	2
Conflicting Circle Lanes	2	2	2
Adj Approach Flow, veh/h	833	1719	406
Demand Flow Rate, veh/h	850	1753	414
Vehicles Circulating, veh/h	393	212	1424
Vehicles Exiting, veh/h	1445	1030	212
Follow-Up Headway, s	3.186	3.186	3.186
Ped Vol Crossing Leg, #/h	0	0	0
Ped Cap Adj	1.000	1.000	1.000
Approach Delay, s/veh	11.1	15.7	21.4
Approach LOS	B	C	C

Lane	Left	Right	Left	Right	Bypass	Left	Right
Designated Moves	LTR	R	L	LTR	R	L	LTR
Assumed Moves	LTR	R	L	LTR	R	L	LTR
RT Channelized					Yield		
Lane Util	0.471	0.529	0.530	0.470		0.529	0.471
Critical Headway, s	4.293	4.113	4.293	4.113		4.293	4.113
Entry Flow, veh/h	400	450	755	669	329	219	195
Cap Entry Lane, veh/h	841	858	964	974	974	388	417
Entry HV Adj Factor	0.979	0.981	0.980	0.981	0.980	0.983	0.979
Flow Entry, veh/h	392	441	740	656	323	215	191
Cap Entry, veh/h	824	842	945	955	955	382	408
V/C Ratio	0.475	0.524	0.783	0.687	0.338	0.564	0.468
Control Delay, s/veh	10.6	11.5	20.0	15.0	7.4	23.8	18.7
LOS	B	B	C	C	A	C	C
95th %tile Queue, veh	3	3	8	6	2	3	2



Lane Group	WBL	WBR	NBT	NBR	SBL	SBT
Lane Configurations	↑ ↘	↑ ↘	↑↑↑ ↘		↑ ↘	↑↑↑
Traffic Volume (vph)	95	180	1530	120	260	1450
Future Volume (vph)	95	180	1530	120	260	1450
Satd. Flow (prot)	1678	1501	4768	0	1678	4821
Flt Permitted	0.950				0.950	
Satd. Flow (perm)	1678	1501	4768	0	1678	4821
Satd. Flow (RTOR)			188	14		
Lane Group Flow (vph)	99	188	1719	0	271	1510
Turn Type	Prot	Perm	NA		Prot	NA
Protected Phases	8		2		1	6
Permitted Phases			8			
Total Split (s)	35.0	35.0	63.0		22.0	85.0
Total Lost Time (s)	5.0	5.0	5.0		5.0	4.0
Act Efect Green (s)	15.0	15.0	62.0		28.1	96.0
Actuated g/C Ratio	0.12	0.12	0.52		0.23	0.80
v/c Ratio	0.47	0.54	0.70		0.69	0.39
Control Delay	54.1	11.4	23.9		72.1	1.5
Queue Delay	0.0	0.0	0.0		0.0	0.0
Total Delay	54.1	11.4	23.9		72.1	1.5
LOS	D	B	C		E	A
Approach Delay	26.2			23.9		12.3
Approach LOS	C			C		B
Queue Length 50th (ft)	74	0	343		221	24
Queue Length 95th (ft)	110	58	440	#428		49
Internal Link Dist (ft)	376		617			1043
Turn Bay Length (ft)				400		
Base Capacity (vph)	419	516	2469		392	3858
Starvation Cap Reductn	0	0	0		0	0
Spillback Cap Reductn	0	0	0		0	0
Storage Cap Reductn	0	0	0		0	0
Reduced v/c Ratio	0.24	0.36	0.70		0.69	0.39

#### Intersection Summary

Cycle Length: 120

Actuated Cycle Length: 120

Offset: 0 (0%), Referenced to phase 2:NBT and 6:SBT, Start of Green, Master Intersection

Control Type: Actuated-Coordinated

Maximum v/c Ratio: 0.70

Intersection Signal Delay: 18.6

Intersection LOS: B

Intersection Capacity Utilization 65.0%

ICU Level of Service C

Analysis Period (min) 15

# 95th percentile volume exceeds capacity, queue may be longer.

Queue shown is maximum after two cycles.

Splits and Phases: 2: Lynnway & Hanson St



Lane Group	NBL	NBT	NBR	SBL	SBT	SBR	NEL	NET	NER	SWL	SWT	SWR
Lane Configurations	↑	↑			↑	↑	↑	↑↑↑		↑	↑↑↑	
Traffic Volume (vph)	35	5	40	15	5	5	85	1555	75	200	1630	15
Future Volume (vph)	35	5	40	15	5	5	85	1555	75	200	1630	15
Satd. Flow (prot)	1678	1529	0	0	1701	1501	1678	4788	0	1678	4816	0
Flt Permitted	0.744					0.746		0.950			0.950	
Satd. Flow (perm)	1314	1529	0	0	1317	1501	1678	4788	0	1678	4816	0
Satd. Flow (RTOR)			42			109		9			2	
Lane Group Flow (vph)	36	47	0	0	21	5	89	1698	0	208	1714	0
Turn Type	Perm	NA		Perm	NA	Perm	Prot	NA	Prot	NA		
Protected Phases		8			4		5	2		1	6	
Permitted Phases	8			4		4						
Total Split (s)	30.0	30.0		30.0	30.0	30.0	20.0	70.0		20.0	70.0	
Total Lost Time (s)	6.0	6.0			6.0	6.0	5.0	5.0		5.0	5.0	
Act Efect Green (s)	8.8	8.8			8.8	8.8	15.0	74.4		23.2	82.5	
Actuated g/C Ratio	0.07	0.07				0.07	0.07	0.12	0.62		0.19	0.69
v/c Ratio	0.38	0.31				0.22	0.02	0.43	0.57		0.64	0.52
Control Delay	63.1	23.1			56.5	0.2	34.0	2.1		41.0	16.0	
Queue Delay	0.0	0.0			0.0	0.0	0.0	0.0		0.0	0.0	
Total Delay	63.1	23.1			56.5	0.2	34.0	2.1		41.0	16.0	
LOS	E	C			E	A	C	A		D	B	
Approach Delay		40.4			45.6			3.7			18.7	
Approach LOS		D			D			A			B	
Queue Length 50th (ft)	27	4			16	0	64	20		157	383	
Queue Length 95th (ft)	61	41			41	0	m98	38		240	441	
Internal Link Dist (ft)		148			94			1043			1847	
Turn Bay Length (ft)							300			300		
Base Capacity (vph)	262	339			263	387	209	2970		323	3312	
Starvation Cap Reductn	0	0			0	0	0	0		0	0	
Spillback Cap Reductn	0	0			0	0	0	0		0	0	
Storage Cap Reductn	0	0			0	0	0	0		0	0	
Reduced v/c Ratio	0.14	0.14			0.08	0.01	0.43	0.57		0.64	0.52	

#### Intersection Summary

Cycle Length: 120

Actuated Cycle Length: 120

Offset: 15 (13%), Referenced to phase 2:NET and 6:SWT, Start of Green

Control Type: Actuated-Coordinated

Maximum v/c Ratio: 0.64

Intersection Signal Delay: 12.3

Intersection LOS: B

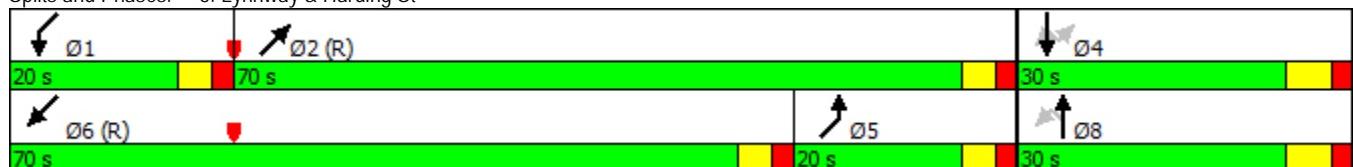
Intersection Capacity Utilization 64.7%

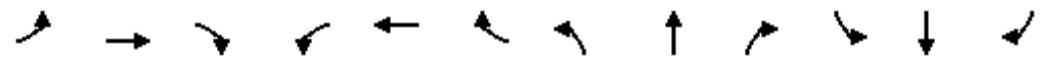
ICU Level of Service C

Analysis Period (min) 15

m Volume for 95th percentile queue is metered by upstream signal.

Splits and Phases: 3: Lynnway & Harding St





Lane Group	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations	↑	↑↑↑			↑↑↑	↑				↑	↑	↑
Traffic Volume (vph)	550	1380	10	0	1190	260	0	0	0	330	80	460
Future Volume (vph)	550	1380	10	0	1190	260	0	0	0	330	80	460
Satd. Flow (prot)	1678	4816	0	0	4821	1501	0	0	0	1678	1766	1501
Flt Permitted	0.950											0.950
Satd. Flow (perm)	1678	4816	0	0	4821	1501	0	0	0	1678	1766	1501
Satd. Flow (RTOR)			2			271						13
Lane Group Flow (vph)	573	1448	0	0	1240	271	0	0	0	344	83	479
Turn Type	Prot	NA			NA	Perm				Perm	NA	pt+ov
Protected Phases	5	2			6					4		4 5
Permitted Phases					6					4		
Total Split (s)	40.0	90.0			50.0	50.0				30.0	30.0	
Total Lost Time (s)	4.0	4.0			4.0	4.0				4.0	4.0	
Act Efect Green (s)	36.0	86.0			46.0	46.0				26.0	26.0	66.0
Actuated g/C Ratio	0.30	0.72			0.38	0.38				0.22	0.22	0.55
v/c Ratio	1.14	0.42			0.67	0.37				0.95	0.22	0.58
Control Delay	114.3	1.4			12.9	3.1				83.0	40.5	20.7
Queue Delay	0.0	0.0			0.0	0.0				0.0	0.0	0.0
Total Delay	114.3	1.4			12.9	3.1				83.0	40.5	20.7
LOS	F	A			B	A				F	D	C
Approach Delay		33.4			11.1						46.2	
Approach LOS		C			B						D	
Queue Length 50th (ft)	~532	21			155	3				265	53	227
Queue Length 95th (ft)	#756	24			130	25				#448	99	333
Internal Link Dist (ft)		1847			1063			493			489	
Turn Bay Length (ft)	600				300					200		200
Base Capacity (vph)	503	3454			1850	742				363	382	831
Starvation Cap Reductn	0	0			0	0				0	0	0
Spillback Cap Reductn	0	0			0	0				0	0	0
Storage Cap Reductn	0	0			0	0				0	0	0
Reduced v/c Ratio	1.14	0.42			0.67	0.37				0.95	0.22	0.58

#### Intersection Summary

Cycle Length: 120

Actuated Cycle Length: 120

Offset: 40 (33%), Referenced to phase 2:EBT and 6:WBT, Start of Green

Control Type: Actuated-Coordinated

Maximum v/c Ratio: 1.14

Intersection Signal Delay: 28.4

Intersection LOS: C

Intersection Capacity Utilization 81.7%

ICU Level of Service D

Analysis Period (min) 15

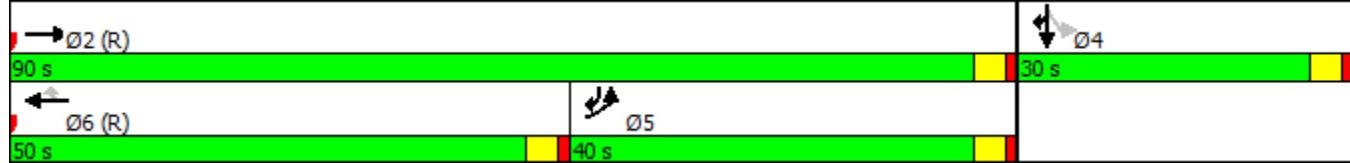
~ Volume exceeds capacity, queue is theoretically infinite.

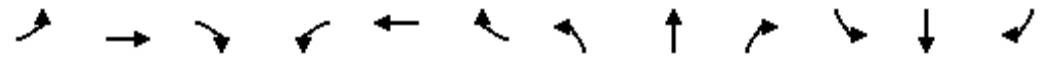
Queue shown is maximum after two cycles.

# 95th percentile volume exceeds capacity, queue may be longer.

Queue shown is maximum after two cycles.

Splits and Phases: 4: Commercial St & Lynnway





Lane Group	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations	↑	↑↑↑		↑	↑↑↑		↑	↑		↔	↔	
Traffic Volume (vph)	115	1560	5	55	1400	50	5	5	5	35	5	30
Future Volume (vph)	115	1560	5	55	1400	50	5	5	5	35	5	30
Satd. Flow (prot)	1678	4821	0	1678	4797	0	1678	1634	0	0	1624	0
Flt Permitted	0.950			0.950			0.737				0.837	
Satd. Flow (perm)	1678	4821	0	1678	4797	0	1302	1634	0	0	1392	0
Satd. Flow (RTOR)		1			8			5			26	
Lane Group Flow (vph)	120	1630	0	57	1510	0	5	10	0	0	72	0
Turn Type	Prot	NA		Prot	NA		Perm	NA		Perm	NA	
Protected Phases	5	2		1	6				8			4
Permitted Phases							8				4	
Total Split (s)	20.0	77.0		20.0	77.0		23.0	23.0		23.0	23.0	
Total Lost Time (s)	5.0	5.0		5.0	5.0		6.0	6.0			6.0	
Act Efect Green (s)	13.0	86.2		13.4	83.2		10.4	10.4			10.4	
Actuated g/C Ratio	0.11	0.72		0.11	0.69		0.09	0.09			0.09	
v/c Ratio	0.66	0.47		0.30	0.45		0.04	0.07			0.50	
Control Delay	64.8	10.4		31.6	2.3		47.8	35.8			46.0	
Queue Delay	0.0	0.0		0.0	0.0		0.0	0.0			0.0	
Total Delay	64.8	10.4		31.6	2.3		47.8	35.8			46.0	
LOS	E	B		C	A		D	D			D	
Approach Delay		14.1			3.4			39.8			46.0	
Approach LOS		B			A			D			D	
Queue Length 50th (ft)	80	298		41	68		4	4			35	
Queue Length 95th (ft)	m134	m361		75	27		16	20			79	
Internal Link Dist (ft)		1063			584			95			161	
Turn Bay Length (ft)	250			400								
Base Capacity (vph)	212	3462		209	3327		184	235			219	
Starvation Cap Reductn	0	0		0	0		0	0			0	
Spillback Cap Reductn	0	0		0	0		0	0			0	
Storage Cap Reductn	0	0		0	0		0	0			0	
Reduced v/c Ratio	0.57	0.47		0.27	0.45		0.03	0.04			0.33	

#### Intersection Summary

Cycle Length: 120

Actuated Cycle Length: 120

Offset: 112 (93%), Referenced to phase 2:EBT and 6:WBT, Start of Green

Control Type: Actuated-Coordinated

Maximum v/c Ratio: 0.66

Intersection Signal Delay: 10.0

Intersection LOS: A

Intersection Capacity Utilization 60.1%

ICU Level of Service B

Analysis Period (min) 15

m Volume for 95th percentile queue is metered by upstream signal.

Splits and Phases: 5: Marine Blvd/Sheppard St & Lynnway





Lane Group	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations	↑	↑↑↑		↑	↑↑↑		↑	↑				
Traffic Volume (vph)	65	1530	15	15	1500	40	30	0	30	0	0	0
Future Volume (vph)	65	1530	15	15	1500	40	30	0	30	0	0	0
Satd. Flow (prot)	1678	4816	0	1678	4802	0	1678	1501	0	0	0	0
Flt Permitted	0.950				0.950			0.950				
Satd. Flow (perm)	1678	4816	0	1678	4802	0	1678	1501	0	0	0	0
Satd. Flow (RTOR)		2			5			230				
Lane Group Flow (vph)	68	1610	0	16	1605	0	31	31	0	0	0	0
Turn Type	Prot	NA		Prot	NA		Split	NA				
Protected Phases	5	2		1	6		8	8				
Permitted Phases												
Total Split (s)	20.0	70.0		20.0	70.0		30.0	30.0				
Total Lost Time (s)	4.0	4.0		4.0	4.0		4.0	4.0				
Act Efect Green (s)	10.4	99.7		7.4	92.3		10.3	10.3				
Actuated g/C Ratio	0.09	0.83		0.06	0.77		0.09	0.09				
v/c Ratio	0.47	0.40		0.16	0.43		0.22	0.09				
Control Delay	62.6	1.5		58.3	3.1		51.5	0.5				
Queue Delay	0.0	0.0		0.0	0.0		0.0	0.0				
Total Delay	62.6	1.5		58.3	3.1		51.5	0.5				
LOS	E	A		E	A		D	A				
Approach Delay		4.0			3.7			26.0				
Approach LOS		A			A			C				
Queue Length 50th (ft)	53	7		13	41		23	0				
Queue Length 95th (ft)	107	61	m29		84		48	0				
Internal Link Dist (ft)		497			543			258				85
Turn Bay Length (ft)				300								
Base Capacity (vph)	223	4000		223	3693		363	505				
Starvation Cap Reductn	0	0		0	0		0	0				
Spillback Cap Reductn	0	0		0	0		0	0				
Storage Cap Reductn	0	0		0	0		0	0				
Reduced v/c Ratio	0.30	0.40		0.07	0.43		0.09	0.06				

#### Intersection Summary

Cycle Length: 120

Actuated Cycle Length: 120

Offset: 98 (82%), Referenced to phase 2:EBT and 6:WBT, Start of Green

Control Type: Actuated-Coordinated

Maximum v/c Ratio: 0.47

Intersection Signal Delay: 4.2

Intersection LOS: A

Intersection Capacity Utilization 49.1%

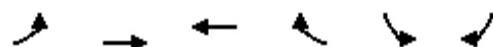
ICU Level of Service A

Analysis Period (min) 15

m Volume for 95th percentile queue is metered by upstream signal.

Splits and Phases: 6: Kingman St & Lynnway





Lane Group	EBL	EBT	WBT	WBR	SBL	SBR
Lane Configurations	↑↑	↑↑↑	↑↑↑	↑	↑↑	
Traffic Volume (vph)	600	985	970	225	300	10
Future Volume (vph)	600	985	970	225	300	10
Satd. Flow (prot)	3255	4821	4821	1501	3252	0
Flt Permitted	0.950				0.954	
Satd. Flow (perm)	3255	4821	4821	1501	3252	0
Satd. Flow (RTOR)				234	3	
Lane Group Flow (vph)	625	1026	1010	234	323	0
Turn Type	Prot	NA	NA	Perm	Prot	
Protected Phases	5	2	6		7	
Permitted Phases				6		
Total Split (s)	50.0	80.0	30.0	30.0	40.0	
Total Lost Time (s)	5.0	4.0	4.0	4.0	4.0	
Act Efct Green (s)	45.0	94.8	44.8	44.8	17.2	
Actuated g/C Ratio	0.38	0.79	0.37	0.37	0.14	
v/c Ratio	0.51	0.27	0.56	0.33	0.69	
Control Delay	14.8	0.8	31.8	4.9	46.0	
Queue Delay	0.0	0.0	0.0	0.0	0.0	
Total Delay	14.8	0.8	31.8	4.9	46.0	
LOS	B	A	C	A	D	
Approach Delay		6.1	26.8		46.0	
Approach LOS		A	C		D	
Queue Length 50th (ft)	157	34	224	0	111	
Queue Length 95th (ft)	84	2	289	56	158	
Internal Link Dist (ft)		431	1171		315	
Turn Bay Length (ft)			600			
Base Capacity (vph)	1220	3808	1799	707	977	
Starvation Cap Reductn	0	0	0	0	0	
Spillback Cap Reductn	0	0	0	0	0	
Storage Cap Reductn	0	0	0	0	0	
Reduced v/c Ratio	0.51	0.27	0.56	0.33	0.33	

#### Intersection Summary

Cycle Length: 120

Actuated Cycle Length: 120

Offset: 112 (93%), Referenced to phase 2:EBT and 6:WBT, Start of Green

Control Type: Actuated-Coordinated

Maximum v/c Ratio: 0.69

Intersection Signal Delay: 18.1

Intersection LOS: B

Intersection Capacity Utilization 55.6%

ICU Level of Service B

Analysis Period (min) 15

Splits and Phases: 7: Lynnway/Carroll Parkway & Market St





Lane Group	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations					↑↑	↑		↑↑	↑		↑↑	
Traffic Volume (vph)	0	0	0	75	410	175	15	375	380	205	230	155
Future Volume (vph)	0	0	0	75	410	175	15	375	380	205	230	155
Satd. Flow (prot)	0	0	0	0	3329	1501	0	3349	1501	0	3170	0
Flt Permitted												0.677
Satd. Flow (perm)	0	0	0	0	3329	1501	0	3094	1501	0	2183	0
Satd. Flow (RTOR)												47
Lane Group Flow (vph)	0	0	0	0	505	182	0	407	396	0	615	0
Turn Type					Split	NA	Perm	Perm	NA	pt+ov	Perm	NA
Protected Phases					3	3		2	2 3			6
Permitted Phases							3	2				6
Total Split (s)					43.0	43.0	50.0	50.0		50.0		50.0
Total Lost Time (s)						4.0	4.0					5.0
Act Efect Green (s)						27.5	27.5	67.3	100.8			67.3
Actuated g/C Ratio						0.23	0.23	0.56	0.84			0.56
v/c Ratio						0.66	0.38	0.23	0.30			0.49
Control Delay						40.7	8.1	8.7	1.1			20.6
Queue Delay						0.0	0.0	0.0	0.1			0.0
Total Delay						40.7	8.1	8.7	1.2			20.6
LOS						D	A	A	A			C
Approach Delay						32.1			5.0			20.6
Approach LOS						C		A				C
Queue Length 50th (ft)						192	12	36	11			163
Queue Length 95th (ft)						228	47	66	12			260
Internal Link Dist (ft)		27				734			315			249
Turn Bay Length (ft)							150					
Base Capacity (vph)						1081	610	1734	1366			1244
Starvation Cap Reductn						0	0	0	253			0
Spillback Cap Reductn						0	0	0	0			0
Storage Cap Reductn						0	0	0	0			0
Reduced v/c Ratio						0.47	0.30	0.23	0.36			0.49

#### Intersection Summary

Cycle Length: 120

Actuated Cycle Length: 120

Offset: 15 (13%), Referenced to phase 2:NBT and 6:SBTL, Start of Green

Control Type: Actuated-Coordinated

Maximum v/c Ratio: 0.66

Intersection Signal Delay: 18.4

Intersection LOS: B

Intersection Capacity Utilization 53.3%

ICU Level of Service A

Analysis Period (min) 15

Splits and Phases: 9: Market St & Broad St





Lane Group	EBL	EBT	EBR	WBL	WBT	WBR2	NBL2	NBL	NBT	NBR	SBL	SBT
Lane Configurations												
Traffic Volume (vph)	55	490	30	25	580	15	20	0	50	15	10	15
Future Volume (vph)	55	490	30	25	580	15	20	0	50	15	10	15
Satd. Flow (prot)	0	1757	1501	0	3335	0	0	1678	1704	0	0	1622
Flt Permitted		0.878			0.914			0.814				0.923
Satd. Flow (perm)	0	1551	1501	0	3055	0	0	1438	1704	0	0	1511
Satd. Flow (RTOR)			136		136				11			
Lane Group Flow (vph)	0	567	31	0	646	0	0	21	68	0	0	57
Turn Type	Perm	NA	Perm	Perm	NA		Perm	Perm	NA		Perm	NA
Protected Phases		2			6				8			4
Permitted Phases	2		2	6				8	8			4
Total Split (s)	50.0	50.0	50.0	50.0	50.0			24.0	24.0	24.0		24.0
Total Lost Time (s)		7.0	7.0		7.0			5.0	5.0			6.0
Act Efct Green (s)	84.1	84.1		84.1				10.5	10.5			9.8
Actuated g/C Ratio	0.70	0.70		0.70				0.09	0.09			0.08
v/c Ratio	0.52	0.03		0.30				0.17	0.43			0.46
Control Delay	7.6	0.0		9.1				51.9	50.7			63.9
Queue Delay	0.0	0.0		0.0				0.0	0.0			0.0
Total Delay	7.6	0.0		9.1				51.9	50.7			63.9
LOS	A	A		A				D	D			E
Approach Delay	7.2			9.1				51.0				63.9
Approach LOS	A			A				D				E
Queue Length 50th (ft)	27	0		70				15	42			43
Queue Length 95th (ft)	#606	m0		195				40	87			85
Internal Link Dist (ft)	734			418					457			220
Turn Bay Length (ft)								150				
Base Capacity (vph)	1086	1092		2181				227	279			226
Starvation Cap Reductn	0	0		0				0	0			0
Spillback Cap Reductn	0	0		0				0	0			0
Storage Cap Reductn	0	0		0				0	0			0
Reduced v/c Ratio	0.52	0.03		0.30				0.09	0.24			0.25

#### Intersection Summary

Cycle Length: 120

Actuated Cycle Length: 120

Offset: 47 (39%), Referenced to phase 2:EBTL and 6:WBT, Start of Green

Control Type: Actuated-Coordinated

Maximum v/c Ratio: 0.52

Intersection Signal Delay: 14.0

Intersection LOS: B

Intersection Capacity Utilization 82.5%

ICU Level of Service E

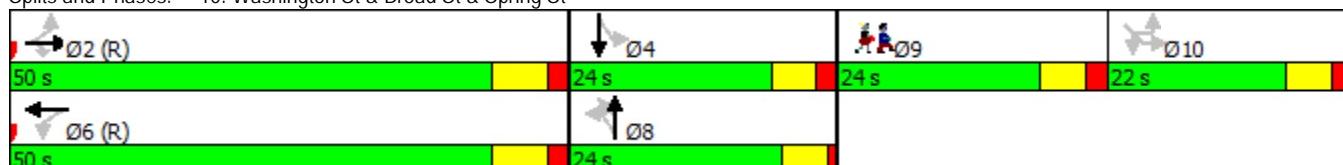
Analysis Period (min) 15

# 95th percentile volume exceeds capacity, queue may be longer.

Queue shown is maximum after two cycles.

m Volume for 95th percentile queue is metered by upstream signal.

Splits and Phases: 10: Washington St & Broad St & Spring St





Lane Group	SBR	SEL2	SEL	SER	SER2	Ø9
Lane Configurations						
Traffic Volume (vph)	30	5	35	50	30	
Future Volume (vph)	30	5	35	50	30	
Satd. Flow (prot)	0	0	1678	1501	0	
Flt Permitted			0.950			
Satd. Flow (perm)	0	0	1678	1501	0	
Satd. Flow (RTOR)			145			
Lane Group Flow (vph)	0	0	41	83	0	
Turn Type		Perm	Perm	Perm		
Protected Phases					9	
Permitted Phases	10	10	10			
Total Split (s)	22.0	22.0	22.0		24.0	
Total Lost Time (s)		6.0	6.0			
Act Efct Green (s)		8.4	8.4			
Actuated g/C Ratio		0.07	0.07			
v/c Ratio		0.35	0.35			
Control Delay		60.6	4.2			
Queue Delay		0.0	0.0			
Total Delay		60.6	4.2			
LOS	E	A				
Approach Delay		22.8				
Approach LOS		C				
Queue Length 50th (ft)		31	0			
Queue Length 95th (ft)		67	3			
Internal Link Dist (ft)		258				
Turn Bay Length (ft)		150				
Base Capacity (vph)		223	325			
Starvation Cap Reductn		0	0			
Spillback Cap Reductn		0	0			
Storage Cap Reductn		0	0			
Reduced v/c Ratio		0.18	0.26			

#### Intersection Summary

Intersection							
Approach	WB		SB		NE		
Entry Lanes	2			2			2
Conflicting Circle Lanes	2			2			2
Adj Approach Flow, veh/h	1037			1411			860
Demand Flow Rate, veh/h	1079			1467			895
Vehicles Circulating, veh/h	488			309			785
Vehicles Exiting, veh/h	1192			1258			309
Follow-Up Headway, s	3.186			3.186			3.186
Ped Vol Crossing Leg, #/h	0			0			0
Ped Cap Adj	1.000			1.000			1.000
Approach Delay, s/veh	17.7			14.0			23.2
Approach LOS	C			B			C
Lane	Left	Right	Left	Right	Bypass	Left	Right
Designated Moves	LTR	R	L	LTR	R	L	TR
Assumed Moves	LTR	R	L	LTR	R	L	TR
RT Channelized	Yield						
Lane Util	0.470	0.530	0.530	0.470	0.545		
Critical Headway, s	4.293	4.113	4.293	4.113	4.293		
Entry Flow, veh/h	507	572	416	369	682	488	407
Cap Entry Lane, veh/h	784	803	896	910	910	627	652
Entry HV Adj Factor	0.961	0.961	0.962	0.962	0.962	0.961	0.961
Flow Entry, veh/h	487	550	400	355	656	469	391
Cap Entry, veh/h	753	772	862	875	875	603	627
V/C Ratio	0.647	0.712	0.464	0.405	0.750	0.778	0.624
Control Delay, s/veh	16.3	18.9	10.1	8.9	19.1	27.6	17.9
LOS	C	C	B	A	C	D	C
95th %tile Queue, veh	5	6	2	2	7	7	4

**TABLE 1**  
**Alternative 1: Traffic Queue Lengths in Feet**

Intersection/Approach	Movement	Weekday AM 50 <sup>th</sup> Percentile	Weekday AM 95 <sup>th</sup> Percentile	Weekday PM 50 <sup>th</sup> Percentile	Weekday PM 95 <sup>th</sup> Percentile	Saturday PM 50 <sup>th</sup> Percentile	Saturday PM 95 <sup>th</sup> Percentile
Lynnway and Hanson Street	--	--	--	--	--	--	--
Lynnway	NB – Through/right	100	233	409	#753	343	440
Lynnway	SB – Left	122	166	188	#338	221	#428
Lynnway	SB – Through/right	0	89	9	22	24	49
Hanson Street	WB – Left	16	33	59	90	74	110
Hanson Street	WB – Right	0	18	0	44	0	58
Lynnway and Harding Street	--	--	--	--	--	--	--
Lynnway	NB – Left	0	18	34	m41	64	m98
Lynnway	NB – Through/right	78	95	116	267	20	38
Lynnway	SB – Left	59	m67	141	m#213	157	240
Lynnway	SB – Through/right	134	138	30	48	383	441
Harding Street	WB – Left	19	48	32	68	27	61
Harding Street	WB – Through/right	0	0	0	0	4	41
Harding Street	EB – Left/Through	4	16	23	53	16	41
Harding Street	EB – Right	0	0	0	0	0	0
Lynnway and Commercial Street	--	--	--	--	--	--	--
Lynnway	NB – Left	169	#248	386	#584	~532	#756
Lynnway	NB – Through/right	12	102	482	528	21	24
Lynnway	SB – Through	366	463	198	255	130	155
Lynnway	SB – Right	11	39	37	55	3	25
Commercial Street	EB – Left	184	279	261	#416	265	#448
Commercial Street	EB – Through	64	115	15	39	53	99
Commercial Street	EB -- Right	351	511	84	128	227	333
Lynnway, Shepard Street, and Marine Boulevard	--	--	--	--	--	--	--
Lynnway	NB – Left	41	m80	144	m208	80	m134
Lynnway	NB – Through/right	168	209	20	88	298	m361
Lynnway	SB – Left	48	m71	29	67	41	75
Lynnway	SB – Through/right	31	54	73	119	27	68
Marine Boulevard	WB – Left	7	23	15	38	4	16
Marine Boulevard	WB – Through/right	0	0	4	23	4	20
Shepard Street	EB – Left/through/right	37	77	40	81	35	79
Lynnway and Kingman Street	--	--	--	--	--	--	--
Lynnway	NB – Left	43	92	49	m80	53	107
Lynnway	NB – Through/right	75	90	140	208	7	61
Lynnway	SB – Left	80	m114	63	113	13	m29
Lynnway	SB – Through/right	73	138	48	87	41	84
Kingman Street	WB – Left	35	66	78	124	23	48
Kingman Street	WB – Through/right	4	40	4	55	0	0

Lynnway, Carroll Parkway, and								
Market Street	--	--	--	--	--	--	--	--
Lynnway	NB – Left	97	134	207	226	84	157	
Lynnway	NB – Through	2	7	79	83	2	34	
Carroll Parkway	SB – Through	382	469	179	232	224	289	
Carroll Parkway	SB – Right	0	48	0	48	0	56	
Market Street	EB – Left	70	105	92	135	111	158	
Carroll Parkway, Nahant Road, and Lynn Shore Drive	--	--	--	--	--	--	--	--
Carroll Parkway	NB – Left	25	50	112	200	25	50	
Carroll Parkway	NB – Right	12	25	75	150	25	50	
Nahant Road	NB – Left	50	100	37	75	90	175	
Nahant Road	NB – Through	12	25	25	50	50	100	
Lynn Shore Drive	SB – Through	150	300	37	75	65	125	
Lynn Shore Drive	SB – Right	200	425	37	75	75	150	
Market Street and Broad Street	--	--	--	--	--	--	--	--
Market Street	NB – Through/left	27	50	14	25	36	66	
Market Street	NB – Right	12	22	63	129	11	12	
Market Street	SB – Left/through/right	97	163	162	226	163	260	
Broad Street	WB – Through/left	196	248	124	185	192	228	
Broad Street	WB – Right	15	109	0	93	12	47	
Broad Street, Washington Street, and Spring Street	--	--	--	--	--	--	--	--
Broad Street	WB – Left/through/right	82	220	50	137	70	195	
Broad Street	EB – Through/left	37	85	79	#481	27	#606	
Broad Street	EB – Right	0	0	0	65	0	0	
Washington Street	NB – Left	77	134	82	138	15	40	
Washington Street	NB – Through/right	58	107	66	115	42	87	
Washington Street	SB – Left/through/right	45	87	72	120	43	85	
Spring Street	SB -- Left/through/right	50	94	94	154	31	67	

# **APPENDIX J**

## **Level of Service (LOS) Analysis**

### **Alternatives 2**



Lane Group	WBL	WBR	NBT	NBR	SBL	SBT
Lane Configurations	↓	↑	↑↓		↓	↑↑
Traffic Volume (vph)	20	15	925	35	150	2210
Future Volume (vph)	20	15	925	35	150	2210
Satd. Flow (prot)	1766	1580	3514	0	1766	3532
Flt Permitted	0.950				0.234	
Satd. Flow (perm)	1766	1580	3514	0	435	3532
Satd. Flow (RTOR)			16	6		
Lane Group Flow (vph)	21	16	1010	0	158	2324
Turn Type	Prot	Perm	NA		pm+pt	NA
Protected Phases	8		2		1	6
Permitted Phases			8		6	
Total Split (s)	31.0	31.0	76.0		13.0	89.0
Total Lost Time (s)	4.0	4.0	4.0		4.0	4.0
Act Efect Green (s)	19.4	19.4	85.3		97.4	99.0
Actuated g/C Ratio	0.16	0.16	0.71		0.81	0.82
v/c Ratio	0.07	0.06	0.40		0.36	0.80
Control Delay	38.5	16.3	9.7		1.1	7.6
Queue Delay	0.0	0.0	0.0		0.0	0.0
Total Delay	38.5	16.3	9.7		1.1	7.6
LOS	D	B	A		A	A
Approach Delay	28.9		9.7			7.2
Approach LOS	C		A			A
Queue Length 50th (ft)	13	0	216		1	88
Queue Length 95th (ft)	35	19	266		m2	158
Internal Link Dist (ft)	376		617			1043
Turn Bay Length (ft)					400	
Base Capacity (vph)	397	367	2500		452	2913
Starvation Cap Reductn	0	0	0		0	6
Spillback Cap Reductn	0	0	0		0	0
Storage Cap Reductn	0	0	0		0	0
Reduced v/c Ratio	0.05	0.04	0.40		0.35	0.80

#### Intersection Summary

Cycle Length: 120

Actuated Cycle Length: 120

Offset: 0 (0%), Referenced to phase 2:NBT and 6:SBTL, Start of Green, Master Intersection

Control Type: Actuated-Coordinated

Maximum v/c Ratio: 0.80

Intersection Signal Delay: 8.1

Intersection LOS: A

Intersection Capacity Utilization 71.7%

ICU Level of Service C

Analysis Period (min) 15

m Volume for 95th percentile queue is metered by upstream signal.

Splits and Phases: 2: Lynnway & Hanson St



Lane Group	NBL	NBT	NBR	SBL	SBT	SBR	NEL	NET	NER	SWL	SWT	SWR
Lane Configurations	↑	↑			↑	↑	↑	↑↑		↑	↑↑	
Traffic Volume (vph)	25	0	5	5	0	5	25	900	20	70	2335	15
Future Volume (vph)	25	0	5	5	0	5	25	900	20	70	2335	15
Satd. Flow (prot)	1766	1580	0	0	1766	1580	1766	3521	0	1766	3529	0
Flt Permitted	0.754				0.754		0.048			0.256		
Satd. Flow (perm)	1402	1580	0	0	1402	1580	89	3521	0	476	3529	0
Satd. Flow (RTOR)		222				64		3			1	
Lane Group Flow (vph)	26	5	0	0	5	5	26	967	0	74	2471	0
Turn Type	Perm	NA		Perm	NA	Perm	pm+pt	NA		pm+pt	NA	
Protected Phases		8			4		5	2		1	6	
Permitted Phases	8				4		4	2			6	
Total Split (s)	32.0	32.0		32.0	32.0	32.0	12.0	76.0		12.0	76.0	
Total Lost Time (s)	4.0	4.0			4.0	4.0	4.0	4.0		4.0	4.0	
Act Efect Green (s)	20.0	20.0			19.8	19.8	93.6	88.0		94.4	91.2	
Actuated g/C Ratio	0.17	0.17			0.16	0.16	0.78	0.73		0.79	0.76	
v/c Ratio	0.11	0.01			0.02	0.02	0.14	0.37		0.16	0.92	
Control Delay	38.7	0.0			35.8	0.0	15.7	8.6		5.4	18.2	
Queue Delay	0.0	0.0			0.0	0.0	0.0	0.0		0.0	0.0	
Total Delay	38.7	0.0			35.8	0.0	15.7	8.6		5.4	18.2	
LOS	D	A			D	A	B	A		A	B	
Approach Delay		32.5			17.9			8.8			17.8	
Approach LOS		C			B			A			B	
Queue Length 50th (ft)	16	0			3	0	6	155		15	~1189	
Queue Length 95th (ft)	41	0			14	0	m27	182		m15	m#1195	
Internal Link Dist (ft)		148			94			1043			1855	
Turn Bay Length (ft)							300			300		
Base Capacity (vph)	327	538			327	417	181	2582		460	2682	
Starvation Cap Reductn	0	0			0	0	0	0		0	0	
Spillback Cap Reductn	0	0			0	0	0	0		0	0	
Storage Cap Reductn	0	0			0	0	0	0		0	0	
Reduced v/c Ratio	0.08	0.01			0.02	0.01	0.14	0.37		0.16	0.92	

#### Intersection Summary

Cycle Length: 120

Actuated Cycle Length: 120

Offset: 98 (82%), Referenced to phase 2:NETL and 6:SWTL, Start of Green

Control Type: Actuated-Coordinated

Maximum v/c Ratio: 0.92

Intersection Signal Delay: 15.4

Intersection LOS: B

Intersection Capacity Utilization 81.3%

ICU Level of Service D

Analysis Period (min) 15

~ Volume exceeds capacity, queue is theoretically infinite.

Queue shown is maximum after two cycles.

# 95th percentile volume exceeds capacity, queue may be longer.

Queue shown is maximum after two cycles.

m Volume for 95th percentile queue is metered by upstream signal.

Splits and Phases: 3: Lynnway & Harding St





Lane Group	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations	↑	↑↑			↑↑	↑				↑	↑	↑
Traffic Volume (vph)	260	765	10	0	1900	275	0	0	0	245	95	535
Future Volume (vph)	260	765	10	0	1900	275	0	0	0	245	95	535
Satd. Flow (prot)	1766	3525	0	0	3532	1580	0	0	0	1766	1859	1580
Flt Permitted	0.056									0.950		
Satd. Flow (perm)	104	3525	0	0	3532	1580	0	0	0	1766	1859	1580
Satd. Flow (RTOR)			3			243						9
Lane Group Flow (vph)	273	815	0	0	1998	289	0	0	0	258	100	563
Turn Type	pm+pt	NA			NA	Prot				Perm	NA	pt+ov
Protected Phases	5	2			6	6				4	4	5
Permitted Phases	2									4		
Total Split (s)	19.0	90.0			71.0	71.0				30.0	30.0	
Total Lost Time (s)	4.0	4.0			4.0	4.0				4.0	4.0	
Act Efect Green (s)	86.0	86.0			67.0	67.0				26.0	26.0	45.0
Actuated g/C Ratio	0.72	0.72			0.56	0.56				0.22	0.22	0.38
v/c Ratio	0.97	0.32			1.01	0.29				0.68	0.25	0.94
Control Delay	70.9	4.4			27.0	0.7				53.1	40.9	61.3
Queue Delay	0.0	0.0			0.0	0.0				0.0	0.0	0.0
Total Delay	70.9	4.4			27.0	0.7				53.1	40.9	61.3
LOS	E	A			C	A				D	D	E
Approach Delay		21.1			23.6						56.8	
Approach LOS		C			C						E	
Queue Length 50th (ft)	117	13			~380	2				185	65	412
Queue Length 95th (ft)	#321	31			m#965	m2				279	115	#643
Internal Link Dist (ft)		1855			1064			493			489	
Turn Bay Length (ft)	600					300				200		200
Base Capacity (vph)	282	2527			1972	989				382	402	598
Starvation Cap Reductn	0	0			0	0				0	0	0
Spillback Cap Reductn	0	0			0	0				0	0	0
Storage Cap Reductn	0	0			0	0				0	0	0
Reduced v/c Ratio	0.97	0.32			1.01	0.29				0.68	0.25	0.94

#### Intersection Summary

Cycle Length: 120

Actuated Cycle Length: 120

Offset: 82 (68%), Referenced to phase 2:EBTL and 6:WBT, Start of Green

Control Type: Actuated-Coordinated

Maximum v/c Ratio: 1.01

Intersection Signal Delay: 30.1

Intersection LOS: C

Intersection Capacity Utilization 89.7%

ICU Level of Service E

Analysis Period (min) 15

~ Volume exceeds capacity, queue is theoretically infinite.

Queue shown is maximum after two cycles.

# 95th percentile volume exceeds capacity, queue may be longer.

Queue shown is maximum after two cycles.

m Volume for 95th percentile queue is metered by upstream signal.

Splits and Phases: 4: Commercial St & Lynnway



Lane Group	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations	↑	↑↑		↑	↑↑		↑	↑		↑	↑↑	
Traffic Volume (vph)	50	955	10	70	2215	45	10	0	5	35	10	15
Future Volume (vph)	50	955	10	70	2215	45	10	0	5	35	10	15
Satd. Flow (prot)	1766	3525	0	1766	3521	0	1766	1580	0	0	1745	0
Flt Permitted	0.049				0.242			0.723				0.842
Satd. Flow (perm)	91	3525	0	450	3521	0	1344	1580	0	0	1512	0
Satd. Flow (RTOR)		2			3			210			13	
Lane Group Flow (vph)	53	1015	0	74	2376	0	11	5	0	0	64	0
Turn Type	pm+pt	NA		pm+pt	NA		Perm	NA		Perm	NA	
Protected Phases	5	2		1	6				8			4
Permitted Phases	2			6			8				4	
Total Split (s)	11.0	77.0		11.0	77.0		32.0	32.0		32.0	32.0	
Total Lost Time (s)	4.0	4.0		4.0	4.0		4.0	4.0			4.0	
Act Efect Green (s)	90.6	86.1		91.2	86.4		20.5	20.5			20.5	
Actuated g/C Ratio	0.76	0.72		0.76	0.72		0.17	0.17			0.17	
v/c Ratio	0.34	0.40		0.18	0.94		0.05	0.01			0.24	
Control Delay	18.2	4.8		1.1	12.6		36.5	0.0			33.7	
Queue Delay	0.0	0.0		0.0	0.6		0.0	0.0			0.0	
Total Delay	18.2	4.8		1.1	13.1		36.5	0.0			33.7	
LOS	B	A		A	B		D	A			C	
Approach Delay		5.5			12.8			25.1			33.7	
Approach LOS		A			B			C			C	
Queue Length 50th (ft)	6	142		2	~1086		7	0			32	
Queue Length 95th (ft)	m26	146		m2	#1226		23	0			70	
Internal Link Dist (ft)		1064			546			95			133	
Turn Bay Length (ft)		400			200							
Base Capacity (vph)	166	2529		418	2536		313	529			362	
Starvation Cap Reductn	0	0		0	30		0	0			0	
Spillback Cap Reductn	0	0		0	0		0	0			0	
Storage Cap Reductn	0	0		0	0		0	0			0	
Reduced v/c Ratio	0.32	0.40		0.18	0.95		0.04	0.01			0.18	

#### Intersection Summary

Cycle Length: 120

Actuated Cycle Length: 120

Offset: 53 (44%), Referenced to phase 2:EBTL and 6:WBT, Start of Green

Control Type: Actuated-Coordinated

Maximum v/c Ratio: 0.94

Intersection Signal Delay: 11.0

Intersection LOS: B

Intersection Capacity Utilization 77.3%

ICU Level of Service D

Analysis Period (min) 15

~ Volume exceeds capacity, queue is theoretically infinite.

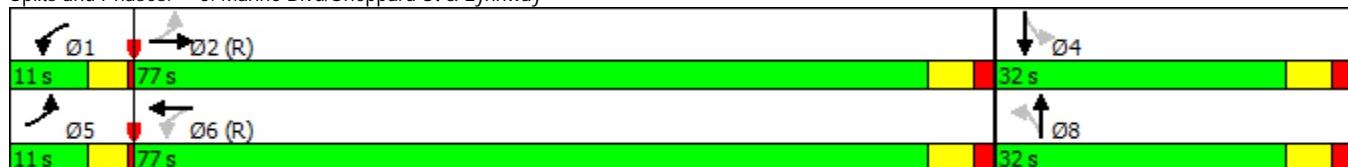
Queue shown is maximum after two cycles.

# 95th percentile volume exceeds capacity, queue may be longer.

Queue shown is maximum after two cycles.

m Volume for 95th percentile queue is metered by upstream signal.

Splits and Phases: 5: Marine Blvd/Sheppard St & Lynnway





Lane Group	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations		↑↑			↑↑		↑↑	↑↑		↑↑	↑↑	
Traffic Volume (vph)	0	1010	30	40	2170	95	10	5	15	25	20	30
Future Volume (vph)	0	1010	30	40	2170	95	10	5	15	25	20	30
Satd. Flow (prot)	0	3518	0	1766	3511	0	1766	1647	0	1766	1690	0
Flt Permitted					0.215			0.722			0.744	
Satd. Flow (perm)	0	3518	0	400	3511	0	1342	1647	0	1383	1690	0
Satd. Flow (RTOR)		5			9			16			14	
Lane Group Flow (vph)	0	1094	0	42	2382	0	11	21	0	26	53	0
Turn Type		NA		pm+pt	NA		Perm	NA		Perm	NA	
Protected Phases		2		1	6				8			4
Permitted Phases				6			8				4	
Total Split (s)		79.0			11.0	90.0		30.0	30.0		30.0	30.0
Total Lost Time (s)					4.0	4.0	4.0	4.0	4.0		4.0	4.0
Act Efct Green (s)		88.3			95.9	96.7		18.0	18.0		18.0	18.0
Actuated g/C Ratio		0.74			0.80	0.81		0.15	0.15		0.15	0.15
v/c Ratio		0.42			0.11	0.84		0.05	0.08		0.13	0.20
Control Delay		3.9			1.3	11.3		38.3	19.9		40.6	32.7
Queue Delay		0.0			0.0	3.0		0.0	0.0		0.0	0.0
Total Delay		3.9			1.3	14.3		38.3	19.9		40.6	32.7
LOS		A			A	B		D	B		D	C
Approach Delay		3.9				14.1			26.2			35.3
Approach LOS		A				B			C			D
Queue Length 50th (ft)		49			1	409		7	3		16	24
Queue Length 95th (ft)		96			m2	#690		23	25		42	60
Internal Link Dist (ft)		546				224			259			262
Turn Bay Length (ft)				200								
Base Capacity (vph)		2591			399	2829		290	369		299	377
Starvation Cap Reductn		45			0	0		0	0		0	0
Spillback Cap Reductn		0			0	340		0	0		0	1
Storage Cap Reductn		0			0	0		0	0		0	0
Reduced v/c Ratio		0.43			0.11	0.96		0.04	0.06		0.09	0.14

#### Intersection Summary

Cycle Length: 120

Actuated Cycle Length: 120

Offset: 39 (33%), Referenced to phase 2:EBT and 6:WBTL, Start of Green

Control Type: Actuated-Coordinated

Maximum v/c Ratio: 0.84

Intersection Signal Delay: 11.6

Intersection LOS: B

Intersection Capacity Utilization 75.7%

ICU Level of Service D

Analysis Period (min) 15

# 95th percentile volume exceeds capacity, queue may be longer.

Queue shown is maximum after two cycles.

m Volume for 95th percentile queue is metered by upstream signal.

Splits and Phases: 15: Blossom St & Lynnway





Lane Group	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations	↑	↑↑		↑	↑↑↑		↑	↑				
Traffic Volume (vph)	55	975	40	95	2240	150	45	5	50	0	0	0
Future Volume (vph)	55	975	40	95	2240	150	45	5	50	0	0	0
Satd. Flow (prot)	1766	3511	0	1766	5029	0	1766	1604	0	0	0	0
Flt Permitted	0.048				0.222			0.950				
Satd. Flow (perm)	89	3511	0	413	5029	0	1766	1604	0	0	0	0
Satd. Flow (RTOR)		5				14			53			
Lane Group Flow (vph)	58	1067	0	100	2513	0	47	58	0	0	0	0
Turn Type	pm+pt	NA		pm+pt	NA		Perm	NA				
Protected Phases	5	2		1	6				8			
Permitted Phases	2			6				8				
Total Split (s)	20.0	70.0		20.0	70.0		30.0	30.0				
Total Lost Time (s)	4.0	4.0		4.0	4.0		4.0	4.0				
Act Efect Green (s)	91.3	84.0		93.1	87.5		18.1	18.1				
Actuated g/C Ratio	0.76	0.70		0.78	0.73		0.15	0.15				
v/c Ratio	0.35	0.43		0.25	0.68		0.18	0.20				
Control Delay	23.9	12.1		2.9	4.7		41.7	13.3				
Queue Delay	0.0	0.0		0.0	0.3		0.0	0.0				
Total Delay	23.9	12.1		2.9	5.0		41.7	13.3				
LOS	C	B		A	A		D	B				
Approach Delay		12.7			4.9			26.0				
Approach LOS		B			A			C				
Queue Length 50th (ft)	25	181		8	406		30	3				
Queue Length 95th (ft)	60	201		m12	132		63	39				
Internal Link Dist (ft)		227			544			258				208
Turn Bay Length (ft)	150			200			150					
Base Capacity (vph)	294	2459		510	3671		382	389				
Starvation Cap Reductn	0	89		0	0		0	0				
Spillback Cap Reductn	0	0		0	427		0	0				
Storage Cap Reductn	0	0		0	0		0	0				
Reduced v/c Ratio	0.20	0.45		0.20	0.77		0.12	0.15				

#### Intersection Summary

Cycle Length: 120

Actuated Cycle Length: 120

Offset: 38 (32%), Referenced to phase 2:EBTL and 6:WBT, Start of Green

Control Type: Actuated-Coordinated

Maximum v/c Ratio: 0.68

Intersection Signal Delay: 7.8

Intersection LOS: A

Intersection Capacity Utilization 64.3%

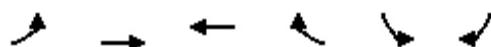
ICU Level of Service C

Analysis Period (min) 15

m Volume for 95th percentile queue is metered by upstream signal.

Splits and Phases: 6: Kingman St & Lynnway





Lane Group	EBL	EBT	WBT	WBR	SBL	SBR
Lane Configurations	↑↑	↑↑	↑↑	↑	↑↑	
Traffic Volume (vph)	425	600	1515	200	160	25
Future Volume (vph)	425	600	1515	200	160	25
Satd. Flow (prot)	3426	3532	3532	1580	3386	0
Flt Permitted	0.950				0.958	
Satd. Flow (perm)	3426	3532	3532	1580	3386	0
Satd. Flow (RTOR)				145	12	
Lane Group Flow (vph)	447	631	1593	210	194	0
Turn Type	Prot	NA	NA	Perm	Prot	
Protected Phases	5	2	6		7	
Permitted Phases				6		
Total Split (s)	30.0	98.0	68.0	68.0	22.0	
Total Lost Time (s)	4.0	4.0	4.0	4.0	4.0	
Act Efct Green (s)	21.5	98.7	73.2	73.2	13.3	
Actuated g/C Ratio	0.18	0.82	0.61	0.61	0.11	
v/c Ratio	0.73	0.22	0.74	0.21	0.50	
Control Delay	42.3	2.6	21.0	4.9	50.2	
Queue Delay	0.0	0.0	0.0	0.0	0.0	
Total Delay	42.3	2.6	21.0	4.9	50.2	
LOS	D	A	C	A	D	
Approach Delay		19.1	19.1		50.2	
Approach LOS		B	B		D	
Queue Length 50th (ft)	164	4	409	18	50	
Queue Length 95th (ft)	235	88	639	63	93	
Internal Link Dist (ft)		345	874		276	
Turn Bay Length (ft)				200		
Base Capacity (vph)	742	2904	2154	1020	518	
Starvation Cap Reductn	0	0	0	0	0	
Spillback Cap Reductn	0	0	0	0	0	
Storage Cap Reductn	0	0	0	0	0	
Reduced v/c Ratio	0.60	0.22	0.74	0.21	0.37	

#### Intersection Summary

Cycle Length: 120

Actuated Cycle Length: 120

Offset: 19 (16%), Referenced to phase 2:EBT and 6:WBT, Start of Green

Control Type: Actuated-Coordinated

Maximum v/c Ratio: 0.74

Intersection Signal Delay: 21.1

Intersection LOS: C

Intersection Capacity Utilization 67.5%

ICU Level of Service C

Analysis Period (min) 15

Splits and Phases: 7: Lynnway/Carroll Parkway & Market St





Lane Group	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations					↑↑	↑		↑↑	↑		↑↑	
Traffic Volume (vph)	0	0	0	53	500	180	10	305	310	155	135	160
Future Volume (vph)	0	0	0	53	500	180	10	305	310	155	135	160
Satd. Flow (prot)	0	0	0	0	3514	1580	0	3525	1580	0	3288	0
Flt Permitted												0.704
Satd. Flow (perm)	0	0	0	0	3514	1580	0	3310	1580	0	2355	0
Satd. Flow (RTOR)						189			326		101	
Lane Group Flow (vph)	0	0	0	0	582	189	0	332	326	0	473	0
Turn Type					Split	NA	Perm	Perm	NA	pt+ov	Perm	NA
Protected Phases					3	3			2	2 3		6
Permitted Phases							3	2				6
Total Split (s)				43.0	43.0	43.0	50.0	50.0	50.0	50.0	50.0	50.0
Total Lost Time (s)						4.0	4.0		4.0			4.0
Act Efect Green (s)						29.4	29.4	66.4	101.4			66.4
Actuated g/C Ratio						0.24	0.24	0.55	0.84			0.55
v/c Ratio						0.68	0.36	0.18	0.24			0.35
Control Delay						41.2	6.4	7.9	1.1			15.9
Queue Delay						0.0	0.0	0.0	0.2			0.0
Total Delay						41.2	6.4	7.9	1.3			15.9
LOS						D	A	A	A			B
Approach Delay						32.7			4.6			15.9
Approach LOS						C		A				B
Queue Length 50th (ft)					223	14		24	14			96
Queue Length 95th (ft)					114	17		55	24			163
Internal Link Dist (ft)	249				662			276				249
Turn Bay Length (ft)						150						
Base Capacity (vph)					1142	641		1831	1421			1348
Starvation Cap Reductn					0	0		0	453			0
Spillback Cap Reductn					0	0		0	0			0
Storage Cap Reductn					0	0		0	0			0
Reduced v/c Ratio					0.51	0.29		0.18	0.34			0.35

#### Intersection Summary

Cycle Length: 120

Actuated Cycle Length: 120

Offset: 90 (75%), Referenced to phase 2:NBT and 6:SBTL, Start of Green

Control Type: Actuated-Coordinated

Maximum v/c Ratio: 0.68

Intersection Signal Delay: 18.8

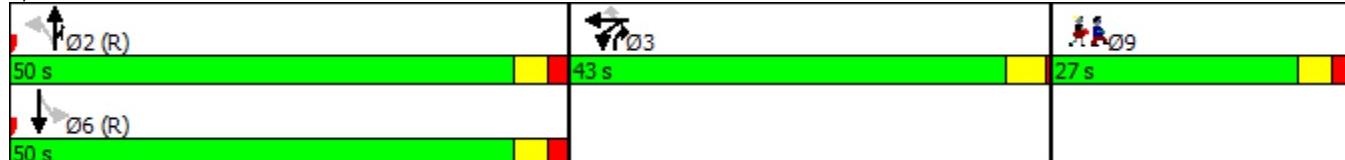
Intersection LOS: B

Intersection Capacity Utilization 46.3%

ICU Level of Service A

Analysis Period (min) 15

Splits and Phases: 9: Market St & Broad St





Lane Group	EBL	EBT	EBR	WBL	WBT	WBR2	NBL2	NBL	NBT	NBR	SBL	SBT
Lane Configurations												
Traffic Volume (vph)	50	220	205	35	580	30	100	0	70	15	20	20
Future Volume (vph)	50	220	205	35	580	30	100	0	70	15	20	20
Satd. Flow (prot)	0	1842	1580	0	3497	0	0	1766	1809	0	0	1747
Flt Permitted		0.802			0.920			0.701				0.879
Satd. Flow (perm)	0	1491	1580	0	3227	0	0	1303	1809	0	0	1561
Satd. Flow (RTOR)			216		136				8			
Lane Group Flow (vph)	0	284	216	0	679	0	0	105	90	0	0	63
Turn Type	Perm	NA	Perm	Perm	NA		Perm	Perm	NA		custom	NA
Protected Phases		2			6				8			
Permitted Phases	2		2	6			8	8			4	4
Total Split (s)	48.0	48.0	48.0	48.0	48.0		24.0	24.0	24.0		24.0	24.0
Total Lost Time (s)		4.0	4.0		4.0			4.0	4.0			4.0
Act Efect Green (s)	75.5	75.5		75.5			15.3	15.3				15.3
Actuated g/C Ratio	0.63	0.63		0.63			0.13	0.13				0.13
v/c Ratio	0.30	0.20		0.33			0.63	0.38				0.32
Control Delay	7.1	1.0		11.1			65.9	47.0				50.4
Queue Delay	0.0	0.0		0.0			0.0	0.0				0.0
Total Delay	7.1	1.0		11.1			65.9	47.0				50.4
LOS	A	A		B			E	D				D
Approach Delay	4.5			11.1				57.2				50.4
Approach LOS	A			B			E					D
Queue Length 50th (ft)	21	0		81			78	59				45
Queue Length 95th (ft)	210	27		224			134	107				86
Internal Link Dist (ft)	662			451				471				214
Turn Bay Length (ft)							150					
Base Capacity (vph)	938	1074		2081			217	308				260
Starvation Cap Reductn	0	0		0			0	0				0
Spillback Cap Reductn	0	0		0			0	0				0
Storage Cap Reductn	0	0		0			0	0				0
Reduced v/c Ratio	0.30	0.20		0.33			0.48	0.29				0.24

#### Intersection Summary

Cycle Length: 120

Actuated Cycle Length: 120

Offset: 10 (8%), Referenced to phase 2:EBTL and 6:WBT, Start of Green

Control Type: Actuated-Coordinated

Maximum v/c Ratio: 0.63

Intersection Signal Delay: 18.5

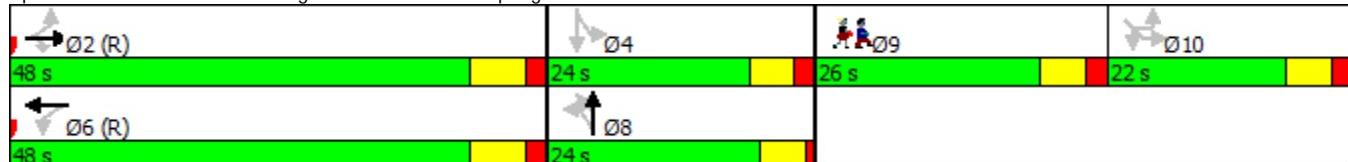
Intersection LOS: B

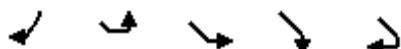
Intersection Capacity Utilization 65.7%

ICU Level of Service C

Analysis Period (min) 15

Splits and Phases: 10: Washington St & Broad St & Spring St





Lane Group	SBR	SEL2	SEL	SER	SER2	Ø9
Lane Configurations			2	2		
Traffic Volume (vph)	20	5	60	120	30	
Future Volume (vph)	20	5	60	120	30	
Satd. Flow (prot)	0	0	1766	1580	0	
Flt Permitted				0.950		
Satd. Flow (perm)	0	0	1766	1580	0	
Satd. Flow (RTOR)				145		
Lane Group Flow (vph)	0	0	68	158	0	
Turn Type		Perm	Perm	Perm		
Protected Phases					9	
Permitted Phases		10	10	10		
Total Split (s)	22.0	22.0	22.0		26.0	
Total Lost Time (s)			4.0	4.0		
Act Efect Green (s)		12.0	12.0			
Actuated g/C Ratio		0.10	0.10			
v/c Ratio		0.39	0.55			
Control Delay		56.1	17.4			
Queue Delay		0.0	0.0			
Total Delay		56.1	17.4			
LOS		E	B			
Approach Delay		29.1				
Approach LOS		C				
Queue Length 50th (ft)		50	9			
Queue Length 95th (ft)		94	73			
Internal Link Dist (ft)		258				
Turn Bay Length (ft)		150				
Base Capacity (vph)		264	360			
Starvation Cap Reductn		0	0			
Spillback Cap Reductn		0	0			
Storage Cap Reductn		0	0			
Reduced v/c Ratio		0.26	0.44			
Intersection Summary						

Intersection							
Approach	WB		SB		NE		
Entry Lanes	2			2			2
Conflicting Circle Lanes	2			2			2
Adj Approach Flow, veh/h	1546		799		526		
Demand Flow Rate, veh/h	1608		831		547		
Vehicles Circulating, veh/h	394		77		695		
Vehicles Exiting, veh/h	848		1925		77		
Follow-Up Headway, s	3.186		3.186		3.186		
Ped Vol Crossing Leg, #/h	0		0		0		
Ped Cap Adj	1.000		1.000		1.000		
Approach Delay, s/veh	43.8		6.5		11.2		
Approach LOS	E		A		B		
Lane	Left	Right	Left	Right	Bypass	Left	Right
Designated Moves	LTR	R	L	LTR	R	L	LTR
Assumed Moves	LTR	R	L	LTR	R	L	LTR
RT Channelized	Yield						
Lane Util	0.470	0.530	0.529	0.471		0.530	0.470
Critical Headway, s	4.293	4.113	4.293	4.113		4.293	4.113
Entry Flow, veh/h	756	852	368	327	136	290	257
Cap Entry Lane, veh/h	841	858	1067	1071	1071	671	695
Entry HV Adj Factor	0.961	0.962	0.962	0.960	0.962	0.961	0.962
Flow Entry, veh/h	727	819	354	314	131	279	247
Cap Entry, veh/h	808	825	1026	1028	1029	645	668
V/C Ratio	0.899	0.993	0.345	0.305	0.127	0.432	0.370
Control Delay, s/veh	34.4	52.1	7.1	6.6	4.6	11.9	10.4
LOS	D	F	A	A	A	B	B
95th %tile Queue, veh	12	17	2	1	0	2	2



Lynnway-Route 1A-Carroll Parkway Study  
2: Lynnway & Hanson St

Alternative 2: 2040 PM

5:00 pm



Lane Group	WBL	WBR	NBT	NBR	SBL	SBT
Lane Configurations	↑ ↗	↗ ↗	↑ ↗	↑ ↘	↗ ↗	↑ ↗
Traffic Volume (vph)	75	100	2140	50	225	1065
Future Volume (vph)	75	100	2140	50	225	1065
Satd. Flow (prot)	1711	1531	3411	0	1711	3421
Flt Permitted	0.950				0.047	
Satd. Flow (perm)	1711	1531	3411	0	85	3421
Satd. Flow (RTOR)			105	3		
Lane Group Flow (vph)	79	105	2303	0	237	1120
Turn Type	Prot	Perm	NA		pm+pt	NA
Protected Phases	8		2		1	6
Permitted Phases			8		6	
Total Split (s)	31.0	31.0	73.0		16.0	89.0
Total Lost Time (s)	5.0	5.0	5.0		5.0	4.0
Act Effct Green (s)	15.7	15.7	78.3		94.3	95.3
Actuated g/C Ratio	0.13	0.13	0.65		0.79	0.79
v/c Ratio	0.35	0.36	1.03		1.10	0.41
Control Delay	48.9	10.8	47.4		117.7	6.4
Queue Delay	0.0	0.0	0.2		0.0	0.0
Total Delay	48.9	10.8	47.5		117.7	6.4
LOS	D	B	D		F	A
Approach Delay	27.2		47.5		25.8	
Approach LOS	C		D		C	
Queue Length 50th (ft)	59	0	801		-146	115
Queue Length 95th (ft)	95	46	#1275		#304	185
Internal Link Dist (ft)	376		617			1043
Turn Bay Length (ft)	200				400	
Base Capacity (vph)	370	413	2226		215	2716
Starvation Cap Reductn	0	0	1		0	0
Spillback Cap Reductn	0	0	0		0	0
Storage Cap Reductn	0	0	0		0	0
Reduced v/c Ratio	0.21	0.25	1.04		1.10	0.41

#### Intersection Summary

Cycle Length: 120

Actuated Cycle Length: 120

Offset: 0 (0%), Referenced to phase 2:NBT and 6:SBTL, Start of Green, Master Intersection

Control Type: Actuated-Coordinated

Maximum v/c Ratio: 1.10

Intersection Signal Delay: 38.9

Intersection LOS: D

Intersection Capacity Utilization 91.4%

ICU Level of Service F

Analysis Period (min) 15

~ Volume exceeds capacity, queue is theoretically infinite.

Queue shown is maximum after two cycles.

# 95th percentile volume exceeds capacity, queue may be longer.

Queue shown is maximum after two cycles.

Splits and Phases: 2: Lynnway & Hanson St



Lynnway-Route 1A-Carroll Parkway Study  
3: Lynnway & Harding St

Alternative 2: 2040 PM

5:00 pm

Lane Group	NBL	NBT	NBR	SBL	SBT	SBR	NEL	NET	NER	SWL	SWT	SWR
Lane Configurations												
Traffic Volume (vph)	40	0	40	30	0	5	45	2230	65	165	1195	65
Future Volume (vph)	40	0	40	30	0	5	45	2230	65	165	1195	65
Satd. Flow (prot)	1711	1531	0	0	1711	1531	1711	3408	0	1711	3394	0
Flt Permitted	0.736				0.730			0.155			0.049	
Satd. Flow (perm)	1325	1531	0	0	1314	1531	279	3408	0	88	3394	0
Satd. Flow (RTOR)		103				64		4			8	
Lane Group Flow (vph)	42	42	0	0	32	5	47	2413	0	174	1325	0
Turn Type	Perm	NA		Perm	NA	Perm	pm+pt	NA		pm+pt	NA	
Protected Phases		8				4		5	2		1	6
Permitted Phases	8				4		4	2			6	
Total Split (s)	32.0	32.0		32.0	32.0	32.0	12.0	75.0		13.0	76.0	
Total Lost Time (s)	6.0	6.0			6.0	6.0	5.0	5.0		5.0	5.0	
Act Effct Green (s)	18.2	18.2			18.2	18.2	87.1	80.1		89.9	84.5	
Actuated g/C Ratio	0.15	0.15			0.15	0.15	0.73	0.67		0.75	0.70	
v/c Ratio	0.21	0.13			0.16	0.02	0.16	1.06		1.00	0.55	
Control Delay	42.8	0.9			41.6	0.2	1.8	44.0		91.8	2.6	
Queue Delay	0.0	0.0			0.0	0.0	0.0	0.0		0.0	0.0	
Total Delay	42.8	0.9			41.6	0.2	1.8	44.0		91.8	2.6	
LOS	D	A			D	A	A	D		F	A	
Approach Delay		21.8			36.0			43.2			13.0	
Approach LOS		C			D			D			B	
Queue Length 50th (ft)	27	0			20	0	7	~1240		-108	51	
Queue Length 95th (ft)	59	0			49	0	m1 m#1189		m#167	m70		
Internal Link Dist (ft)		148			94			1043			1857	
Turn Bay Length (ft)							300			300		
Base Capacity (vph)	287	412		284	381	285	2276			174	2392	
Starvation Cap Reductn	0	0			0	0	0	0		0	0	
Spillback Cap Reductn	0	0			0	0	0	0		0	0	
Storage Cap Reductn	0	0			0	0	0	0		0	0	
Reduced v/c Ratio	0.15	0.10			0.11	0.01	0.16	1.06		1.00	0.55	

Intersection Summary

Cycle Length: 120

Actuated Cycle Length: 120

Offset: 25 (21%), Referenced to phase 2:NETL and 6:SWTL, Start of Green

Control Type: Actuated-Coordinated

Maximum v/c Ratio: 1.06

Intersection Signal Delay: 31.6

Intersection LOS: C

Intersection Capacity Utilization 96.6%

ICU Level of Service F

Analysis Period (min) 15

~ Volume exceeds capacity, queue is theoretically infinite.

Queue shown is maximum after two cycles.

# 95th percentile volume exceeds capacity, queue may be longer.

Queue shown is maximum after two cycles.

m Volume for 95th percentile queue is metered by upstream signal.

Splits and Phases: 3: Lynnway & Harding St



# Lynnway-Route 1A-Carroll Parkway Study

## 4: Commercial St & Lynnway

Alternative 2: 2040 PM

5:00 pm



Lane Group	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations	↑	↑↑			↑↑	↑				↑	↑	↑
Traffic Volume (vph)	540	1950	5	0	1095	295	0	0	0	340	25	285
Future Volume (vph)	540	1950	5	0	1095	295	0	0	0	340	25	285
Satd. Flow (prot)	1711	3421	0	0	3421	1531	0	0	0	1711	1801	1531
Flt Permitted	0.082										0.950	
Satd. Flow (perm)	148	3421	0	0	3421	1531	0	0	0	1711	1801	1531
Satd. Flow (RTOR)						310						15
Lane Group Flow (vph)	568	2056	0	0	1151	310	0	0	0	358	26	300
Turn Type	pm+pt	NA			NA	Perm				Perm	NA	pt+ov
Protected Phases	5	2			6						4	45
Permitted Phases	2					6					4	
Total Split (s)	42.0	90.0			48.0	48.0				30.0	30.0	
Total Lost Time (s)	4.0	4.0			4.0	4.0				4.0	4.0	
Act Effct Green (s)	86.0	86.0			45.0	45.0				26.0	26.0	67.0
Actuated g/C Ratio	0.72	0.72			0.38	0.38				0.22	0.22	0.56
v/c Ratio	0.97	0.84			0.90	0.40				0.97	0.07	0.35
Control Delay	39.1	17.5			48.7	9.3				86.4	38.1	14.9
Queue Delay	0.0	0.0			0.0	0.0				0.0	0.0	0.0
Total Delay	39.1	17.5			48.7	9.3				86.4	38.1	14.9
LOS	D	B			D	A				F	D	B
Approach Delay	22.2				40.3						53.2	
Approach LOS	C				D						D	
Queue Length 50th (ft)	308	877			480	54				277	16	113
Queue Length 95th (ft)	m290	m837			#563	89				#467	41	172
Internal Link Dist (ft)	1857				1085			493			489	
Turn Bay Length (ft)	600					300				200		200
Base Capacity (vph)	601	2451			1282	767				370	390	874
Starvation Cap Reductn	0	0			0	0				0	0	0
Spillback Cap Reductn	0	0			0	0				0	0	0
Storage Cap Reductn	0	0			0	0				0	0	0
Reduced v/c Ratio	0.95	0.84			0.90	0.40				0.97	0.07	0.34

### Intersection Summary

Cycle Length: 120

Actuated Cycle Length: 120

Offset: 115 (96%), Referenced to phase 2:EBTL and 6:WBT, Start of Green

Control Type: Actuated-Coordinated

Maximum v/c Ratio: 0.97

Intersection Signal Delay: 32.2

Intersection LOS: C

Intersection Capacity Utilization 90.6%

ICU Level of Service E

Analysis Period (min) 15

# 95th percentile volume exceeds capacity, queue may be longer.

Queue shown is maximum after two cycles.

m Volume for 95th percentile queue is metered by upstream signal.

Splits and Phases: 4: Commercial St & Lynnway



Lynnway-Route 1A-Carroll Parkway Study  
5: Marine Blvd/Sheppard St & Lynnway

Alternative 2: 2040 PM

5:00 pm

Lane Group	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations	↑	↑↑		↑	↑↑		↑	↑			↔	
Traffic Volume (vph)	175	2105	20	35	1345	20	20	5	10	40	5	25
Future Volume (vph)	175	2105	20	35	1345	20	20	5	10	40	5	25
Satd. Flow (prot)	1711	3418	0	1711	3414	0	1711	1615	0	0	1666	0
Flt Permitted	0.123				0.050			0.738				0.813
Satd. Flow (perm)	221	3418	0	90	3414	0	1329	1615	0	0	1394	0
Satd. Flow (RTOR)		1				2			11			21
Lane Group Flow (vph)	184	2235	0	37	1435	0	21	16	0	0	73	0
Turn Type	pm+pt	NA		pm+pt	NA		Perm	NA		Perm	NA	
Protected Phases	5	2		1	6				8			4
Permitted Phases	2			6				8				4
Total Split (s)	15.0	75.0		13.0	73.0		32.0	32.0		32.0		32.0
Total Lost Time (s)	6.0	6.0		6.0	6.0		6.0	6.0				6.0
Act Effct Green (s)	93.2	88.7		87.5	80.5		15.3	15.3				15.3
Actuated g/C Ratio	0.78	0.74		0.73	0.67		0.13	0.13				0.13
v/c Ratio	0.65	0.88		0.23	0.63		0.12	0.07				0.37
Control Delay	21.2	14.7		14.8	4.6		43.0	23.8				37.3
Queue Delay	0.0	1.8		0.0	0.1		0.0	0.0				0.0
Total Delay	21.2	16.5		14.8	4.6		43.0	23.8				37.3
LOS	C	B		B	A		D	C				D
Approach Delay		16.8			4.9			34.7				37.3
Approach LOS		B			A			C				D
Queue Length 50th (ft)	18	161		1	42		15	4				39
Queue Length 95th (ft)	m64	m#1186		m8	221		36	23				76
Internal Link Dist (ft)		1085			554			123				133
Turn Bay Length (ft)	250		200									
Base Capacity (vph)	287	2526		160	2289		287	358				318
Starvation Cap Reductn	0	0		0	103		0	0				0
Spillback Cap Reductn	0	158		0	0		0	0				0
Storage Cap Reductn	0	0		0	0		0	0				0
Reduced v/c Ratio	0.64	0.94		0.23	0.66		0.07	0.04				0.23

Intersection Summary

Cycle Length: 120

Actuated Cycle Length: 120

Offset: 106 (88%), Referenced to phase 2:EBTL and 6:WBTL, Start of Green

Control Type: Actuated-Coordinated

Maximum v/c Ratio: 0.88

Intersection Signal Delay: 13.0

Intersection LOS: B

Intersection Capacity Utilization 91.6%

ICU Level of Service F

Analysis Period (min) 15

# 95th percentile volume exceeds capacity, queue may be longer.

Queue shown is maximum after two cycles.

m Volume for 95th percentile queue is metered by upstream signal.

Splits and Phases: 5: Marine Blvd/Sheppard St & Lynnway



Lynnway-Route 1A-Carroll Parkway Study  
15: Blossom St & Lynnway

Alternative 2: 2040 PM

5:00 pm



Lane Group	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Traffic Volume (vph)	0	2205	25	25	1250	155	20	10	25	30	10	80
Future Volume (vph)	0	2205	25	25	1250	155	20	10	25	30	10	80
Satd. Flow (prot)	0	3414	0	1711	3363	0	1711	1612	0	1711	1561	0
Flt Permitted					0.045			0.669			0.733	
Satd. Flow (perm)	0	3414	0	81	3363	0	1205	1612	0	1320	1561	0
Satd. Flow (RTOR)		2			27			26			84	
Lane Group Flow (vph)	0	2345	0	26	1477	0	21	37	0	32	95	0
Turn Type	NA		pm+pt	NA			Perm	NA		Perm	NA	
Protected Phases	2		1	6				8			4	
Permitted Phases			6				8				4	
Total Split (s)	80.0		9.0	77.0			31.0	31.0		31.0	31.0	
Total Lost Time (s)	5.0		5.0	5.0			5.0	5.0		5.0	5.0	
Act Effct Green (s)	86.5		91.9	91.9			18.1	18.1		18.1	18.1	
Actuated g/C Ratio	0.72		0.77	0.77			0.15	0.15		0.15	0.15	
v/c Ratio	0.95		0.21	0.57			0.12	0.14		0.16	0.31	
Control Delay	20.1		12.6	4.3			40.5	19.5		41.6	13.1	
Queue Delay	3.2		0.0	0.0			0.0	0.0		0.0	0.0	
Total Delay	23.4		12.6	4.3			40.5	19.5		41.6	13.1	
LOS	C		B	A			D	B		D	B	
Approach Delay	23.4			4.5				27.1			20.3	
Approach LOS	C			A				C			C	
Queue Length 50th (ft)	-1071		2	94			13	7		20	7	
Queue Length 95th (ft)	#1199		m18	91			36	36		49	52	
Internal Link Dist (ft)	554			242				259			262	
Turn Bay Length (ft)			200									
Base Capacity (vph)	2462		125	2582			261	369		286	404	
Starvation Cap Reductn	0		0	0			0	0		0	0	
Spillback Cap Reductn	78		0	0			0	0		0	0	
Storage Cap Reductn	0		0	0			0	0		0	0	
Reduced v/c Ratio	0.98		0.21	0.57			0.08	0.10		0.11	0.24	

#### Intersection Summary

Cycle Length: 120

Actuated Cycle Length: 120

Offset: 90 (75%), Referenced to phase 2:EBT and 6:WBTL, Start of Green

Control Type: Actuated-Coordinated

Maximum v/c Ratio: 0.95

Intersection Signal Delay: 16.3

Intersection LOS: B

Intersection Capacity Utilization 79.7%

ICU Level of Service D

Analysis Period (min) 15

~ Volume exceeds capacity, queue is theoretically infinite.

Queue shown is maximum after two cycles.

# 95th percentile volume exceeds capacity, queue may be longer.

Queue shown is maximum after two cycles.

m Volume for 95th percentile queue is metered by upstream signal.

Splits and Phases: 15: Blossom St & Lynnway



Lynnway-Route 1A-Carroll Parkway Study  
6: Kingman St/ & Lynnway

Alternative 2: 2040 PM

5:00 pm

Lane Group	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations	↑	↑↑		↑	↑↑	↑	↑	↑				
Traffic Volume (vph)	65	2185	35	75	1290	40	100	5	115	0	0	0
Future Volume (vph)	65	2185	35	75	1290	40	100	5	115	0	0	0
Satd. Flow (prot)	1711	3414	0	1711	4891	0	1711	1541	0	0	0	0
Flt Permitted	0.950			0.048			0.950					
Satd. Flow (perm)	1711	3414	0	86	4891	0	1711	1541	0	0	0	0
Satd. Flow (RTOR)			3			7			91			
Lane Group Flow (vph)	68	2335	0	79	1398	0	105	126	0	0	0	0
Turn Type	Prot	NA		pm+pt	NA		Split	NA				
Protected Phases	5	2		1	6		8	8				
Permitted Phases				6								
Total Split (s)	14.0	80.0		10.0	76.0		30.0	30.0				
Total Lost Time (s)	4.0	4.0		4.0	4.0		4.0	4.0				
Act Effct Green (s)	9.4	87.4		90.2	84.2		16.6	16.6				
Actuated g/C Ratio	0.08	0.73		0.75	0.70		0.14	0.14				
v/c Ratio	0.51	0.94		0.54	0.41		0.44	0.43				
Control Delay	49.1	10.9		35.9	3.7		51.1	18.9				
Queue Delay	0.0	0.1		0.0	0.0		0.0	0.0				
Total Delay	49.1	11.0		35.9	3.7		51.1	18.9				
LOS	D	B		D	A		D	B				
Approach Delay		12.1			5.4			33.5				
Approach LOS		B			A			C				
Queue Length 50th (ft)	55	85		15	52		79	25				
Queue Length 95th (ft)	m63	#1182		m65	88		121	75				
Internal Link Dist (ft)		175			544			258				85
Turn Bay Length (ft)	150		300									
Base Capacity (vph)	142	2486		146	3433		370	405				
Starvation Cap Reductn	0	6		0	0		0	0				
Spillback Cap Reductn	0	0		0	0		0	0				
Storage Cap Reductn	0	0		0	0		0	0				
Reduced v/c Ratio	0.48	0.94		0.54	0.41		0.28	0.31				

Intersection Summary

Cycle Length: 120

Actuated Cycle Length: 120

Offset: 97 (81%), Referenced to phase 2:EBT and 6:WBTL, Start of Green

Control Type: Actuated-Coordinated

Maximum v/c Ratio: 0.94

Intersection Signal Delay: 10.9

Intersection LOS: B

Intersection Capacity Utilization 77.8%

ICU Level of Service D

Analysis Period (min) 15

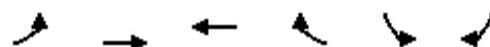
# 95th percentile volume exceeds capacity, queue may be longer.

Queue shown is maximum after two cycles.

m Volume for 95th percentile queue is metered by upstream signal.

Splits and Phases: 6: Kingman St/ & Lynnway





Lane Group	EBL	EBT	WBT	WBR	SBL	SBR
Lane Configurations	↑↑	↑↑	↑↑	↑	↑↑	
Traffic Volume (vph)	815	1450	805	165	215	15
Future Volume (vph)	815	1450	805	165	215	15
Satd. Flow (prot)	3319	3421	3421	1531	3303	0
Flt Permitted	0.950				0.955	
Satd. Flow (perm)	3319	3421	3421	1531	3303	0
Satd. Flow (RTOR)				174	5	
Lane Group Flow (vph)	857	1525	846	174	242	0
Turn Type	Prot	NA	NA	Perm	Prot	
Protected Phases	5	2	6		7	
Permitted Phases				6		
Total Split (s)	48.0	95.0	47.0	47.0	25.0	
Total Lost Time (s)	5.0	4.0	4.0	4.0	4.0	
Act Effct Green (s)	43.0	97.6	49.6	49.6	14.4	
Actuated g/C Ratio	0.36	0.81	0.41	0.41	0.12	
v/c Ratio	0.72	0.55	0.60	0.24	0.60	
Control Delay	21.4	1.5	30.2	4.4	49.3	
Queue Delay	0.0	0.0	0.0	0.0	0.0	
Total Delay	21.4	1.5	30.2	4.4	49.3	
LOS	C	A	C	A	D	
Approach Delay		8.7	25.8		49.3	
Approach LOS		A	C		D	
Queue Length 50th (ft)	244	39	262	0	93	
Queue Length 95th (ft)	m258	m54	349	45	134	
Internal Link Dist (ft)		433	1170		315	
Turn Bay Length (ft)				800		
Base Capacity (vph)	1189	2781	1412	734	582	
Starvation Cap Reductn	0	0	0	0	0	
Spillback Cap Reductn	0	0	0	0	0	
Storage Cap Reductn	0	0	0	0	0	
Reduced v/c Ratio	0.72	0.55	0.60	0.24	0.42	

#### Intersection Summary

Cycle Length: 120

Actuated Cycle Length: 120

Offset: 100 (83%), Referenced to phase 2:EBT and 6:WBT, Start of Green

Control Type: Actuated-Coordinated

Maximum v/c Ratio: 0.72

Intersection Signal Delay: 16.2

Intersection LOS: B

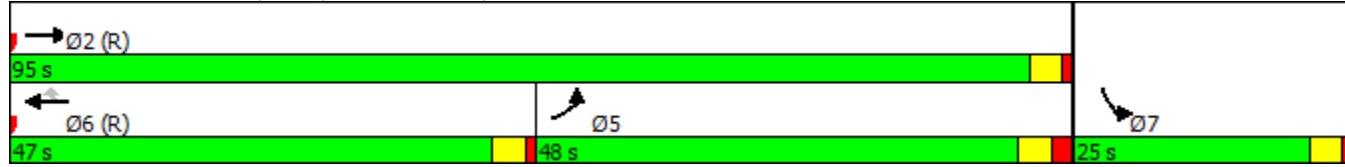
Intersection Capacity Utilization 64.0%

ICU Level of Service B

Analysis Period (min) 15

m Volume for 95th percentile queue is metered by upstream signal.

Splits and Phases: 7: Lynnway/Carroll Parkway & Market St



Lynnway-Route 1A-Carroll Parkway Study  
9: Market St & Broad St

Alternative 2: 2040 PM  
5:00 pm



Lane Group	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations					↑↑	↑		↑↑	↑		↑↑	
Traffic Volume (vph)	0	0	0	50	335	205	15	395	570	290	175	160
Future Volume (vph)	0	0	0	50	335	205	15	395	570	290	175	160
Satd. Flow (prot)	0	0	0	0	3397	1531	0	3414	1531	0	3216	0
Flt Permitted					0.993				0.921			0.637
Satd. Flow (perm)	0	0	0	0	3397	1531	0	3151	1531	0	2097	0
Satd. Flow (RTOR)						216			599			56
Lane Group Flow (vph)	0	0	0	0	405	216	0	431	599	0	657	0
Turn Type					Split	NA	Perm	Perm	NA	pt+ov	Perm	NA
Protected Phases					8	8			2	28		6
Permitted Phases							8	2				6
Total Split (s)				29.0	29.0	29.0	64.0	64.0		64.0	64.0	
Total Lost Time (s)					5.0	5.0		5.0				5.0
Act Effct Green (s)					21.9	21.9		71.9	100.8			71.9
Actuated g/C Ratio					0.18	0.18		0.60	0.84			0.60
v/c Ratio					0.65	0.47		0.23	0.43			0.51
Control Delay					40.3	10.9		2.8	4.7			17.6
Queue Delay					0.0	0.0		0.0	1.3			0.0
Total Delay					40.3	10.9		2.8	6.0			17.6
LOS					D	B		A	A			B
Approach Delay					30.1			4.6				17.6
Approach LOS					C			A				B
Queue Length 50th (ft)					120	0		15	106			174
Queue Length 95th (ft)					179	84		26	174			239
Internal Link Dist (ft)	27					712			315			249
Turn Bay Length (ft)						150						
Base Capacity (vph)					679	479		1888	1378			1279
Starvation Cap Reductn					0	0		0	537			0
Spillback Cap Reductn					0	0		0	0			0
Storage Cap Reductn					0	0		0	0			0
Reduced v/c Ratio					0.60	0.45		0.23	0.71			0.51

Intersection Summary

Cycle Length: 120

Actuated Cycle Length: 120

Offset: 33 (28%), Referenced to phase 2:NBTL and 6:SBTL, Start of Green

Control Type: Actuated-Coordinated

Maximum v/c Ratio: 0.65

Intersection Signal Delay: 15.2

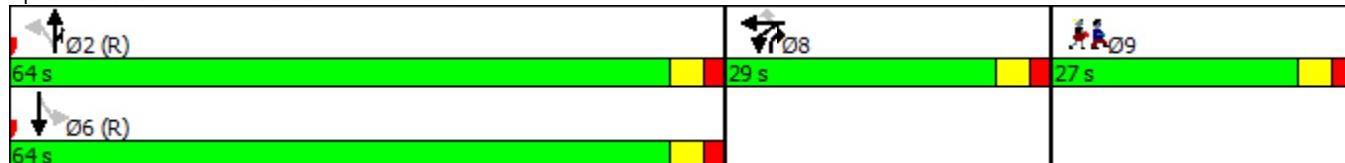
Intersection LOS: B

Intersection Capacity Utilization 63.1%

ICU Level of Service B

Analysis Period (min) 15

Splits and Phases: 9: Market St & Broad St



Lynnway-Route 1A-Carroll Parkway Study  
10: Washington St & Broad St & Spring St

Alternative 2: 2040 PM

5:00 pm



Lane Group	EBL	EBT	EBR	WBL	WBT	WBR2	NBL2	NBL	NBT	NBR	SBL	SBT
Lane Configurations												
Traffic Volume (vph)	15	415	405	20	375	5	105	0	75	25	5	20
Future Volume (vph)	15	415	405	20	375	5	105	0	75	25	5	20
Satd. Flow (prot)	0	1797	1531	0	3408	0	0	1711	1734	0	0	1617
Flt Permitted		0.978			0.917			0.617				0.983
Satd. Flow (perm)	0	1761	1531	0	3131	0	0	1111	1734	0	0	1593
Satd. Flow (RTOR)			426		127				12			
Lane Group Flow (vph)	0	452	426	0	420	0	0	110	105	0	0	100
Turn Type	Perm	NA	Perm	Perm	NA		Perm	Perm	NA		Perm	NA
Protected Phases		2			6				8			4
Permitted Phases	2		2	6			8	8			4	
Total Split (s)	51.0	51.0	51.0	51.0	51.0		25.0	25.0	25.0		25.0	25.0
Total Lost Time (s)		7.0	7.0		7.0			6.0	6.0			6.0
Act Effct Green (s)	63.2	63.2		63.2			15.5	15.5				15.5
Actuated g/C Ratio	0.53	0.53		0.53			0.13	0.13				0.13
v/c Ratio	0.49	0.42		0.25			0.77	0.45				0.49
Control Delay	13.4	2.1		13.8			82.7	47.9				55.8
Queue Delay	0.0	0.0		0.0			0.0	0.0				0.0
Total Delay	13.4	2.1		13.8			82.7	47.9				55.8
LOS	B	A		B			F	D				E
Approach Delay	7.9			13.8			65.7					55.8
Approach LOS	A			B			E					E
Queue Length 50th (ft)	60	0		52			83	66				72
Queue Length 95th (ft)	182	46		126			#155	121				126
Internal Link Dist (ft)	712			345				416				214
Turn Bay Length (ft)							150					
Base Capacity (vph)	927	1008		1709			175	284				252
Starvation Cap Reductn	0	0		0			0	0				0
Spillback Cap Reductn	0	0		0			0	0				0
Storage Cap Reductn	0	0		0			0	0				0
Reduced v/c Ratio	0.49	0.42		0.25			0.63	0.37				0.40

#### Intersection Summary

Cycle Length: 120

Actuated Cycle Length: 120

Offset: 44 (37%), Referenced to phase 2:EBTL and 6:WBTL, Start of Green

Control Type: Actuated-Coordinated

Maximum v/c Ratio: 0.77

Intersection Signal Delay: 23.4

Intersection LOS: C

Intersection Capacity Utilization 73.5%

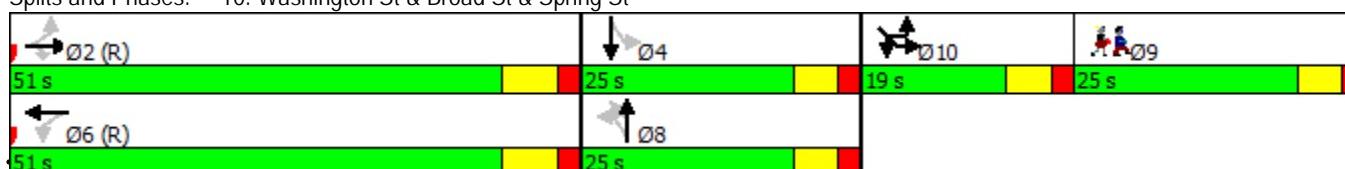
ICU Level of Service D

Analysis Period (min) 15

# 95th percentile volume exceeds capacity, queue may be longer.

Queue shown is maximum after two cycles.

Splits and Phases: 10: Washington St & Broad St & Spring St





Lane Group	SBR	SEL2	SEL	SER	SER2	Ø9
Lane Configurations						
Traffic Volume (vph)	70	15	105	100	30	
Future Volume (vph)	70	15	105	100	30	
Satd. Flow (prot)	0	0	1711	1531	0	
Flt Permitted			0.950			
Satd. Flow (perm)	0	0	1711	1531	0	
Satd. Flow (RTOR)			136			
Lane Group Flow (vph)	0	0	126	137	0	
Turn Type		Prot	Prot	Prot		
Protected Phases		10	10	10		9
Permitted Phases						
Total Split (s)	19.0	19.0	19.0		25.0	
Total Lost Time (s)		6.0	6.0			
Act Effct Green (s)		12.3	12.3			
Actuated g/C Ratio		0.10	0.10			
v/c Ratio		0.72	0.49			
Control Delay		74.7	14.8			
Queue Delay		0.0	0.0			
Total Delay		74.7	14.8			
LOS		E	B			
Approach Delay		43.5				
Approach LOS		D				
Queue Length 50th (ft)		94	1			
Queue Length 95th (ft)		#179	61			
Internal Link Dist (ft)		258				
Turn Bay Length (ft)		150				
Base Capacity (vph)		189	290			
Starvation Cap Reductn		0	0			
Spillback Cap Reductn		0	0			
Storage Cap Reductn		0	0			
Reduced v/c Ratio		0.67	0.47			
Intersection Summary						

**Intersection**

Intersection Delay, s/veh 17.1

Intersection LOS C

Approach	WB	SB	NE
Entry Lanes	2	2	2
Conflicting Circle Lanes	2	2	2
Adj Approach Flow, veh/h	841	1809	410
Demand Flow Rate, veh/h	858	1846	418
Vehicles Circulating, veh/h	397	214	1513
Vehicles Exiting, veh/h	1534	1041	214
Follow-Up Headway, s	3.186	3.186	3.186
Ped Vol Crossing Leg, #/h	0	0	0
Ped Cap Adj	1.000	1.000	1.000
Approach Delay, s/veh	11.3	18.2	24.6
Approach LOS	B	C	C

Lane	Left	Right	Left	Right	Bypass	Left	Right
Designated Moves	LTR	R	L	LTR	R	L	LTR
Assumed Moves	LTR	R	L	LTR	R	L	LTR
RT Channelized					Yield		
Lane Util	0.470	0.530	0.530	0.470		0.531	0.469
Critical Headway, s	4.293	4.113	4.293	4.113		4.293	4.113
Entry Flow, veh/h	403	455	802	711	333	222	196
Cap Entry Lane, veh/h	839	856	962	973	973	363	392
Entry HV Adj Factor	0.981	0.980	0.980	0.980	0.980	0.979	0.983
Flow Entry, veh/h	395	446	786	697	326	217	193
Cap Entry, veh/h	823	838	943	954	954	356	385
V/C Ratio	0.480	0.532	0.833	0.731	0.342	0.611	0.500
Control Delay, s/veh	10.8	11.7	23.8	16.9	7.4	27.9	20.8
LOS	B	B	C	C	A	D	C
95th %tile Queue, veh	3	3	10	7	2	4	3





Lane Group	WBL	WBR	NBT	NBR	SBL	SBT
Lane Configurations	↑ ↘	↑ ↘	↑ ↗ ↘	↑ ↗	↑ ↘	↑ ↗ ↘
Traffic Volume (vph)	95	180	1530	120	260	1450
Future Volume (vph)	95	180	1530	120	260	1450
Satd. Flow (prot)	1678	1501	3319	0	1678	3355
Flt Permitted	0.950				0.053	
Satd. Flow (perm)	1678	1501	3319	0	94	3355
Satd. Flow (RTOR)		191	10			
Lane Group Flow (vph)	101	191	1754	0	276	1541
Turn Type	Prot	Perm	NA		pm+pt	NA
Protected Phases	8		2		1	6
Permitted Phases		8			6	
Total Split (s)	31.0	31.0	67.0		22.0	89.0
Total Lost Time (s)	5.0	5.0	5.0		5.0	4.0
Act Efect Green (s)	16.5	16.5	70.0		93.5	94.5
Actuated g/C Ratio	0.14	0.14	0.58		0.78	0.79
v/c Ratio	0.44	0.51	0.90		0.87	0.58
Control Delay	51.0	10.7	28.3		60.4	8.3
Queue Delay	0.0	0.0	0.0		0.0	0.0
Total Delay	51.0	10.7	28.3		60.4	8.3
LOS	D	B	C		E	A
Approach Delay	24.6		28.3			16.2
Approach LOS	C		C			B
Queue Length 50th (ft)	76	0	438		197	236
Queue Length 95th (ft)	118	61	#882		m#296	321
Internal Link Dist (ft)	376		617			1043
Turn Bay Length (ft)				400		
Base Capacity (vph)	363	474	1941		321	2641
Starvation Cap Reductn	0	0	0		0	0
Spillback Cap Reductn	0	0	0		0	0
Storage Cap Reductn	0	0	0		0	0
Reduced v/c Ratio	0.28	0.40	0.90		0.86	0.58

#### Intersection Summary

Cycle Length: 120

Actuated Cycle Length: 120

Offset: 0 (0%), Referenced to phase 2:NBT and 6:SBTL, Start of Green, Master Intersection

Control Type: Actuated-Coordinated

Maximum v/c Ratio: 0.90

Intersection Signal Delay: 22.3

Intersection LOS: C

Intersection Capacity Utilization 80.1%

ICU Level of Service D

Analysis Period (min) 15

# 95th percentile volume exceeds capacity, queue may be longer.

Queue shown is maximum after two cycles.

m Volume for 95th percentile queue is metered by upstream signal.

Splits and Phases: 2: Lynnway & Hanson St



Lane Group	NBL	NBT	NBR	SBL	SBT	SBR	NEL	NET	NER	SWL	SWT	SWR
Lane Configurations	↑	↑			↑	↑	↑	↑↑		↑	↑↑	
Traffic Volume (vph)	35	5	40	15	5	5	85	1555	75	200	1630	15
Future Volume (vph)	35	5	40	15	5	5	85	1555	75	200	1630	15
Satd. Flow (prot)	1678	1529	0	0	1701	1501	1678	3332	0	1678	3352	0
Flt Permitted	0.744					0.798		0.092			0.062	
Satd. Flow (perm)	1314	1529	0	0	1409	1501	162	3332	0	109	3352	0
Satd. Flow (RTOR)			43			109		6			1	
Lane Group Flow (vph)	37	48	0	0	21	5	90	1732	0	213	1748	0
Turn Type	Perm	NA		Perm	NA	Perm	pm+pt	NA		pm+pt	NA	
Protected Phases			8			4		5	2		1	6
Permitted Phases	8					4		2			6	
Total Split (s)	32.0	32.0		32.0	32.0	32.0	14.0	67.0		21.0	74.0	
Total Lost Time (s)	6.0	6.0			6.0	6.0	5.0	5.0		5.0	5.0	
Act Efect Green (s)	18.1	18.1			18.1	18.1	74.4	74.4		79.2	79.2	
Actuated g/C Ratio	0.15	0.15				0.15	0.15	0.62	0.62		0.66	0.66
v/c Ratio	0.19	0.18				0.10	0.02	0.42	0.84		0.85	0.79
Control Delay	42.3	14.7			39.9	0.0	13.9	9.0		40.1	28.8	
Queue Delay	0.0	0.0			0.0	0.0	0.0	0.0		0.0	0.0	
Total Delay	42.3	14.7			39.9	0.0	13.9	9.0		40.1	28.8	
LOS	D	B			D	A	B	A		D	C	
Approach Delay		26.7			32.2				9.2		30.1	
Approach LOS		C			C			A			C	
Queue Length 50th (ft)	23	3			13	0	6	~693		125	732	
Queue Length 95th (ft)	54	36			36	0	m16	#858		m162	m773	
Internal Link Dist (ft)		148			94			1043			1847	
Turn Bay Length (ft)							300			300		
Base Capacity (vph)	284	364			305	410	214	2067		280	2211	
Starvation Cap Reductn	0	0			0	0	0	0		0	0	
Spillback Cap Reductn	0	0			0	0	0	0		0	0	
Storage Cap Reductn	0	0			0	0	0	0		0	0	
Reduced v/c Ratio	0.13	0.13			0.07	0.01	0.42	0.84		0.76	0.79	

#### Intersection Summary

Cycle Length: 120

Actuated Cycle Length: 120

Offset: 22 (18%), Referenced to phase 2:NETL and 6:SWTL, Start of Green

Control Type: Actuated-Coordinated

Maximum v/c Ratio: 0.85

Intersection Signal Delay: 20.3

Intersection LOS: C

Intersection Capacity Utilization 79.6%

ICU Level of Service D

Analysis Period (min) 15

~ Volume exceeds capacity, queue is theoretically infinite.

Queue shown is maximum after two cycles.

# 95th percentile volume exceeds capacity, queue may be longer.

Queue shown is maximum after two cycles.

m Volume for 95th percentile queue is metered by upstream signal.

Splits and Phases: 3: Lynnway & Harding St





Lane Group	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations	↑	↑↑			↑↑	↑				↑	↑	↑
Traffic Volume (vph)	550	1380	10	0	1190	260	0	0	0	330	80	460
Future Volume (vph)	550	1380	10	0	1190	260	0	0	0	330	80	460
Satd. Flow (prot)	1678	3352	0	0	3355	1501	0	0	0	1678	1766	1501
Flt Permitted	0.080											0.950
Satd. Flow (perm)	141	3352	0	0	3355	1501	0	0	0	1678	1766	1501
Satd. Flow (RTOR)		2				262						12
Lane Group Flow (vph)	584	1477	0	0	1264	276	0	0	0	351	85	489
Turn Type	pm+pt	NA			NA	Perm				Perm	NA	pt+ov
Protected Phases	5	2			6					4		4 5
Permitted Phases	2				6					4		
Total Split (s)	40.0	90.0			50.0	50.0				30.0	30.0	
Total Lost Time (s)	4.0	4.0			4.0	4.0				4.0	4.0	
Act Efct Green (s)	86.0	86.0			46.0	46.0				26.0	26.0	66.0
Actuated g/C Ratio	0.72	0.72			0.38	0.38				0.22	0.22	0.55
v/c Ratio	1.04	0.61			0.98	0.38				0.97	0.22	0.59
Control Delay	70.7	2.5			38.6	4.1				86.7	40.6	21.1
Queue Delay	0.0	0.0			0.0	0.0				0.0	0.0	0.0
Total Delay	70.7	2.5			38.6	4.1				86.7	40.6	21.1
LOS	E	A			D	A				F	D	C
Approach Delay		21.8			32.4						47.8	
Approach LOS		C			C						D	
Queue Length 50th (ft)	-454	33			507	0				271	55	235
Queue Length 95th (ft)	m#647	36			#653	64				#461	101	343
Internal Link Dist (ft)		1847			1063			493			489	
Turn Bay Length (ft)	600				300					200		200
Base Capacity (vph)	562	2402			1286	736				363	382	830
Starvation Cap Reductn	0	0			0	0				0	0	0
Spillback Cap Reductn	0	0			0	0				0	0	0
Storage Cap Reductn	0	0			0	0				0	0	0
Reduced v/c Ratio	1.04	0.61			0.98	0.38				0.97	0.22	0.59

#### Intersection Summary

Cycle Length: 120

Actuated Cycle Length: 120

Offset: 45 (38%), Referenced to phase 2:EBTL and 6:WBT, Start of Green

Control Type: Actuated-Coordinated

Maximum v/c Ratio: 1.04

Intersection Signal Delay: 30.7

Intersection LOS: C

Intersection Capacity Utilization 93.3%

ICU Level of Service F

Analysis Period (min) 15

~ Volume exceeds capacity, queue is theoretically infinite.

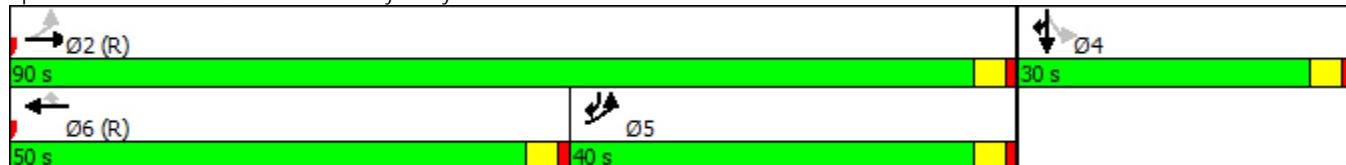
Queue shown is maximum after two cycles.

# 95th percentile volume exceeds capacity, queue may be longer.

Queue shown is maximum after two cycles.

m Volume for 95th percentile queue is metered by upstream signal.

Splits and Phases: 4: Commercial St & Lynnway





Lane Group	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations	↑	↑↑		↑	↑↑		↑	↑		↑	↑	
Traffic Volume (vph)	115	1560	5	55	1400	50	5	5	5	35	5	30
Future Volume (vph)	115	1560	5	55	1400	50	5	5	5	35	5	30
Satd. Flow (prot)	1678	3355	0	1678	3339	0	1678	1634	0	0	1624	0
Flt Permitted	0.950				0.950			0.730				0.837
Satd. Flow (perm)	1678	3355	0	1678	3339	0	1289	1634	0	0	1392	0
Satd. Flow (RTOR)					5			5				27
Lane Group Flow (vph)	122	1663	0	58	1541	0	5	10	0	0	74	0
Turn Type	Prot	NA		Prot	NA		Perm	NA		Perm	NA	
Protected Phases	5	2		1	6				8			4
Permitted Phases							8				4	
Total Split (s)	21.0	82.0		15.0	76.0		23.0	23.0		23.0	23.0	
Total Lost Time (s)	5.0	5.0		5.0	5.0		6.0	6.0			6.0	
Act Efect Green (s)	13.2	89.0		9.4	81.8		11.6	11.6			11.6	
Actuated g/C Ratio	0.11	0.74		0.08	0.68		0.10	0.10			0.10	
v/c Ratio	0.66	0.67		0.44	0.68		0.04	0.06			0.47	
Control Delay	63.4	12.8		41.7	2.5		46.2	34.5			42.4	
Queue Delay	0.0	0.0		0.0	0.1		0.0	0.0			0.0	
Total Delay	63.4	12.8		41.7	2.6		46.2	34.5			42.4	
LOS	E	B		D	A		D	C			D	
Approach Delay		16.2			4.0			38.4			42.4	
Approach LOS		B			A			D			D	
Queue Length 50th (ft)	87	362		44	14		4	4			35	
Queue Length 95th (ft)	m135	m681		m61	21		16	20			81	
Internal Link Dist (ft)		1063			584			95			161	
Turn Bay Length (ft)	250			400								
Base Capacity (vph)	223	2489		139	2277		182	235			220	
Starvation Cap Reductn	0	0		0	79		0	0			0	
Spillback Cap Reductn	0	17		0	0		0	0			0	
Storage Cap Reductn	0	0		0	0		0	0			0	
Reduced v/c Ratio	0.55	0.67		0.42	0.70		0.03	0.04			0.34	

#### Intersection Summary

Cycle Length: 120

Actuated Cycle Length: 120

Offset: 118 (98%), Referenced to phase 2:EBT and 6:WBT, Start of Green

Control Type: Actuated-Coordinated

Maximum v/c Ratio: 0.68

Intersection Signal Delay: 11.3

Intersection LOS: B

Intersection Capacity Utilization 74.1%

ICU Level of Service D

Analysis Period (min) 15

m Volume for 95th percentile queue is metered by upstream signal.

Splits and Phases: 5: Marine Blvd/Sheppard St & Lynnway



Lane Group	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations		↑↑			↑↑		↑↑	↑↑		↑↑	↑↑	
Traffic Volume (vph)	0	1555	45	30	1430	120	5	10	10	10	10	30
Future Volume (vph)	0	1555	45	30	1430	120	5	10	10	10	10	30
Satd. Flow (prot)	0	3342	0	1678	3315	0	1678	1634	0	1678	1568	0
Flt Permitted					0.092			0.729			0.743	
Satd. Flow (perm)	0	3342	0	162	3315	0	1287	1634	0	1312	1568	0
Satd. Flow (RTOR)		5			18			11			32	
Lane Group Flow (vph)	0	1700	0	32	1647	0	5	22	0	11	43	0
Turn Type		NA		pm+pt	NA			Perm	NA		Perm	NA
Protected Phases		2		1	6				8			4
Permitted Phases				6			8				4	
Total Split (s)		80.0		10.0	76.0		30.0	30.0		30.0	30.0	
Total Lost Time (s)		4.0		4.0	4.0		4.0	4.0		4.0	4.0	
Act Efect Green (s)		90.9		96.1	96.9		17.8	17.8		17.8	17.8	
Actuated g/C Ratio		0.76		0.80	0.81		0.15	0.15		0.15	0.15	
v/c Ratio		0.67		0.16	0.61		0.03	0.09		0.06	0.17	
Control Delay		3.9		3.6	4.1		37.4	25.2		38.4	18.4	
Queue Delay		0.0		0.0	0.0		0.0	0.0		0.0	0.0	
Total Delay		3.9		3.6	4.1		37.4	25.2		38.4	18.4	
LOS		A		A	A		D	C		D	B	
Approach Delay		3.9			4.0			27.5			22.5	
Approach LOS		A			A			C			C	
Queue Length 50th (ft)		587		2	58		3	7		7	7	
Queue Length 95th (ft)		56		m5	64		14	30		23	38	
Internal Link Dist (ft)		584			204			259			262	
Turn Bay Length (ft)												
Base Capacity (vph)		2532		205	2680		278	362		284	364	
Starvation Cap Reductn		0		0	0		0	0		0	0	
Spillback Cap Reductn		0		0	0		0	0		0	0	
Storage Cap Reductn		0		0	0		0	0		0	0	
Reduced v/c Ratio		0.67		0.16	0.61		0.02	0.06		0.04	0.12	

#### Intersection Summary

Cycle Length: 120

Actuated Cycle Length: 120

Offset: 104 (87%), Referenced to phase 2:EBT and 6:WBL, Start of Green

Control Type: Actuated-Coordinated

Maximum v/c Ratio: 0.67

Intersection Signal Delay: 4.4

Intersection LOS: A

Intersection Capacity Utilization 59.2%

ICU Level of Service B

Analysis Period (min) 15

m Volume for 95th percentile queue is metered by upstream signal.

Splits and Phases: 15: Blossom St & Lynnway



Lane Group	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations	↑	↑↑		↑	↑↑↑		↑	↑				
Traffic Volume (vph)	65	1530	15	15	1500	40	30	0	30	0	0	0
Future Volume (vph)	65	1530	15	15	1500	40	30	0	30	0	0	0
Satd. Flow (prot)	1678	3352	0	1678	4802	0	1678	1501	0	0	0	0
Flt Permitted	0.114				0.111			0.950				
Satd. Flow (perm)	201	3352	0	196	4802	0	1678	1501	0	0	0	0
Satd. Flow (RTOR)		1			6			134				
Lane Group Flow (vph)	69	1642	0	16	1637	0	32	32	0	0	0	0
Turn Type	pm+pt	NA		pm+pt	NA		Split	NA				
Protected Phases	5	2		1	6		8	8				
Permitted Phases	2			6								
Total Split (s)	12.0	78.0		12.0	78.0		30.0	30.0				
Total Lost Time (s)	4.0	4.0		4.0	4.0		4.0	4.0				
Act Efect Green (s)	94.6	92.3		92.4	87.6		18.0	18.0				
Actuated g/C Ratio	0.79	0.77		0.77	0.73		0.15	0.15				
v/c Ratio	0.28	0.64		0.07	0.47		0.13	0.09				
Control Delay	5.0	3.2		2.4	3.1		40.6	0.5				
Queue Delay	0.0	0.0		0.0	0.0		0.0	0.0				
Total Delay	5.0	3.2		2.4	3.1		40.6	0.5				
LOS	A	A		A	A		D	A				
Approach Delay		3.3			3.1			20.6				
Approach LOS		A			A			C				
Queue Length 50th (ft)	3	43		1	69		20	0				
Queue Length 95th (ft)	m11	106		m3	79		48	0				
Internal Link Dist (ft)		212			543			258				85
Turn Bay Length (ft)				300								
Base Capacity (vph)	257	2578		251	3507		363	430				
Starvation Cap Reductn	0	41		0	0		0	0				
Spillback Cap Reductn	0	0		0	0		0	0				
Storage Cap Reductn	0	0		0	0		0	0				
Reduced v/c Ratio	0.27	0.65		0.06	0.47		0.09	0.07				

#### Intersection Summary

Cycle Length: 120

Actuated Cycle Length: 120

Offset: 103 (86%), Referenced to phase 2:EBTL and 6:WBT, Start of Green

Control Type: Actuated-Coordinated

Maximum v/c Ratio: 0.64

Intersection Signal Delay: 3.5

Intersection LOS: A

Intersection Capacity Utilization 62.8%

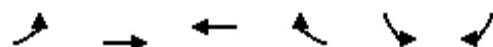
ICU Level of Service B

Analysis Period (min) 15

m Volume for 95th percentile queue is metered by upstream signal.

Splits and Phases: 6: Kingman St & Lynnway





Lane Group	EBL	EBT	WBT	WBR	SBL	SBR
Lane Configurations	↑↑	↑↑	↑↑	↑	↑↑	
Traffic Volume (vph)	600	985	970	225	300	10
Future Volume (vph)	600	985	970	225	300	10
Satd. Flow (prot)	3255	3355	3355	1501	3252	0
Flt Permitted	0.950				0.954	
Satd. Flow (perm)	3255	3355	3355	1501	3252	0
Satd. Flow (RTOR)				20	3	
Lane Group Flow (vph)	638	1047	1031	239	330	0
Turn Type	Prot	NA	NA	pm+ov	Prot	
Protected Phases	5	2	6	7	7	
Permitted Phases				6		
Total Split (s)	31.0	80.0	49.0	40.0	40.0	
Total Lost Time (s)	5.0	4.0	4.0	4.0	4.0	
Act Efct Green (s)	26.0	94.4	63.4	85.0	17.6	
Actuated g/C Ratio	0.22	0.79	0.53	0.71	0.15	
v/c Ratio	0.90	0.40	0.58	0.22	0.69	
Control Delay	48.5	4.0	21.5	6.1	49.3	
Queue Delay	0.0	0.0	0.0	0.0	0.0	
Total Delay	48.5	4.0	21.5	6.1	49.3	
LOS	D	A	C	A	D	
Approach Delay		20.8	18.6		49.3	
Approach LOS		C	B		D	
Queue Length 50th (ft)	213	48	274	52	129	
Queue Length 95th (ft)	#348	110	377	82	153	
Internal Link Dist (ft)		433	1171		315	
Turn Bay Length (ft)	200			600		
Base Capacity (vph)	705	2639	1772	1069	977	
Starvation Cap Reductn	0	0	0	0	0	
Spillback Cap Reductn	0	0	0	0	0	
Storage Cap Reductn	0	0	0	0	0	
Reduced v/c Ratio	0.90	0.40	0.58	0.22	0.34	

#### Intersection Summary

Cycle Length: 120

Actuated Cycle Length: 120

Offset: 108 (90%), Referenced to phase 2:EBT and 6:WBT, Start of Green

Control Type: Actuated-Coordinated

Maximum v/c Ratio: 0.90

Intersection Signal Delay: 22.8

Intersection LOS: C

Intersection Capacity Utilization 64.7%

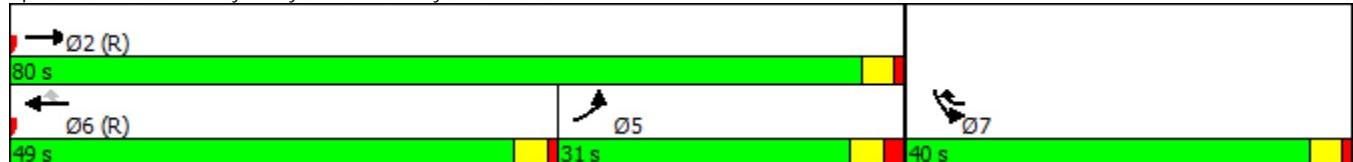
ICU Level of Service C

Analysis Period (min) 15

# 95th percentile volume exceeds capacity, queue may be longer.

Queue shown is maximum after two cycles.

Splits and Phases: 7: Lynnway/Carroll Parkway & Market St



	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations					↑↑	↑		↑↑	↑		↑↑	
Traffic Volume (vph)	0	0	0	75	410	175	15	375	380	205	230	155
Future Volume (vph)	0	0	0	75	410	175	15	375	380	205	230	155
Satd. Flow (prot)	0	0	0	0	3329	1501	0	3349	1501	0	3170	0
Flt Permitted					0.992			0.921			0.674	
Satd. Flow (perm)	0	0	0	0	3329	1501	0	3090	1501	0	2173	0
Satd. Flow (RTOR)					186			404			48	
Lane Group Flow (vph)	0	0	0	0	516	186	0	414	404	0	627	0
Turn Type				Split	NA	Perm	Perm	NA	pt+ov	Perm	NA	
Protected Phases				3	3			2	2 3		6	
Permitted Phases						3	2				6	
Total Split (s)				43.0	43.0	43.0	50.0	50.0		50.0	50.0	
Total Lost Time (s)					4.0	4.0		5.0			5.0	
Act Efct Green (s)					28.2	28.2		66.6	100.8		66.6	
Actuated g/C Ratio					0.24	0.24		0.56	0.84		0.56	
v/c Ratio					0.66	0.38		0.24	0.30		0.51	
Control Delay					40.3	8.9		4.9	1.1		21.4	
Queue Delay					0.0	0.0		0.0	0.4		0.0	
Total Delay					40.3	8.9		4.9	1.5		21.4	
LOS					D	A		A	A		C	
Approach Delay					32.0			3.2			21.4	
Approach LOS					C			A			C	
Queue Length 50th (ft)					195	14		24	1		171	
Queue Length 95th (ft)					233	85		m37	m13		272	
Internal Link Dist (ft)	27				734			315			249	
Turn Bay Length (ft)					150							
Base Capacity (vph)					1081	613		1714	1362		1227	
Starvation Cap Reductn					0	0		0	515		0	
Spillback Cap Reductn					0	0		0	0		0	
Storage Cap Reductn					0	0		0	0		0	
Reduced v/c Ratio					0.48	0.30		0.24	0.48		0.51	

#### Intersection Summary

Cycle Length: 120

Actuated Cycle Length: 120

Offset: 38 (32%), Referenced to phase 2:NBT and 6:SBTL, Start of Green

Control Type: Actuated-Coordinated

Maximum v/c Ratio: 0.66

Intersection Signal Delay: 17.9

Intersection LOS: B

Intersection Capacity Utilization 54.1%

ICU Level of Service A

Analysis Period (min) 15

m Volume for 95th percentile queue is metered by upstream signal.

Splits and Phases: 9: Market St & Broad St



Lane Group	EBL	EBT	EBR	WBL	WBT	WBR2	NBL2	NBL	NBT	NBR	SBL	SBT
Lane Configurations												
Traffic Volume (vph)	55	490	30	25	580	15	20	0	50	15	10	15
Future Volume (vph)	55	490	30	25	580	15	20	0	50	15	10	15
Satd. Flow (prot)	0	1757	1501	0	3335	0	0	1678	1704	0	0	1622
Flt Permitted		0.876			0.912			0.799				0.918
Satd. Flow (perm)	0	1547	1501	0	3048	0	0	1411	1704	0	0	1503
Satd. Flow (RTOR)			136		136				11			
Lane Group Flow (vph)	0	579	32	0	659	0	0	21	69	0	0	59
Turn Type	Perm	NA	Perm	Perm	NA		Perm	Perm	NA		Perm	NA
Protected Phases		2			6				8			4
Permitted Phases	2		2	6				8	8			4
Total Split (s)	50.0	50.0	50.0	50.0	50.0			24.0	24.0		24.0	24.0
Total Lost Time (s)			7.0	7.0		7.0			5.0	5.0		6.0
Act Efect Green (s)	83.9	83.9			83.9			10.7	10.7			9.9
Actuated g/C Ratio	0.70	0.70			0.70			0.09	0.09			0.08
v/c Ratio	0.54	0.03			0.30			0.17	0.43			0.48
Control Delay	8.2	0.0			9.3			51.7	50.4			64.2
Queue Delay	0.0	0.0			0.0			0.0	0.0			0.0
Total Delay	8.2	0.0			9.3			51.7	50.4			64.2
LOS	A	A			A			D	D			E
Approach Delay	7.8				9.3				50.7			64.2
Approach LOS	A				A				D			E
Queue Length 50th (ft)	28	0			72			15	43			44
Queue Length 95th (ft)	#639	m0			202			40	88			86
Internal Link Dist (ft)	734				418				457			220
Turn Bay Length (ft)								150				
Base Capacity (vph)	1081	1089			2171			223	279			225
Starvation Cap Reductn	0	0			0			0	0			0
Spillback Cap Reductn	0	0			0			0	0			0
Storage Cap Reductn	0	0			0			0	0			0
Reduced v/c Ratio	0.54	0.03			0.30			0.09	0.25			0.26

#### Intersection Summary

Cycle Length: 120

Actuated Cycle Length: 120

Offset: 66 (55%), Referenced to phase 2:EBTL and 6:WBT, Start of Green

Control Type: Actuated-Coordinated

Maximum v/c Ratio: 0.54

Intersection Signal Delay: 14.4

Intersection LOS: B

Intersection Capacity Utilization 83.6%

ICU Level of Service E

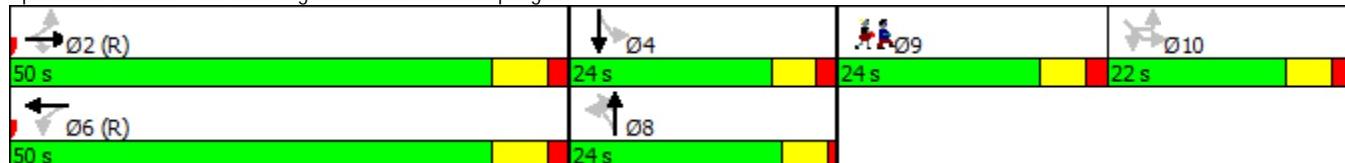
Analysis Period (min) 15

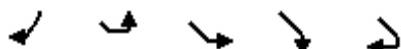
# 95th percentile volume exceeds capacity, queue may be longer.

Queue shown is maximum after two cycles.

m Volume for 95th percentile queue is metered by upstream signal.

Splits and Phases: 10: Washington St & Broad St & Spring St





Lane Group	SBR	SEL2	SEL	SER	SER2	Ø9
Lane Configurations						
Traffic Volume (vph)	30	5	35	50	30	
Future Volume (vph)	30	5	35	50	30	
Satd. Flow (prot)	0	0	1678	1501	0	
Flt Permitted			0.950			
Satd. Flow (perm)	0	0	1678	1501	0	
Satd. Flow (RTOR)			145			
Lane Group Flow (vph)	0	0	42	85	0	
Turn Type		Perm	Perm	Perm		
Protected Phases					9	
Permitted Phases		10	10	10		
Total Split (s)	22.0	22.0	22.0	24.0		
Total Lost Time (s)		6.0	6.0			
Act Efct Green (s)		8.5	8.5			
Actuated g/C Ratio		0.07	0.07			
v/c Ratio		0.36	0.35			
Control Delay		60.7	4.6			
Queue Delay		0.0	0.0			
Total Delay		60.7	4.6			
LOS		E	A			
Approach Delay		23.2				
Approach LOS		C				
Queue Length 50th (ft)		32	0			
Queue Length 95th (ft)		68	4			
Internal Link Dist (ft)		258				
Turn Bay Length (ft)		150				
Base Capacity (vph)		223	325			
Starvation Cap Reductn		0	0			
Spillback Cap Reductn		0	0			
Storage Cap Reductn		0	0			
Reduced v/c Ratio		0.19	0.26			
Intersection Summary						

Intersection							
Approach	WB		SB		NE		
Entry Lanes	2			2			2
Conflicting Circle Lanes	2			2			2
Adj Approach Flow, veh/h	1037		1411		860		
Demand Flow Rate, veh/h	1079		1467		895		
Vehicles Circulating, veh/h	488		309		785		
Vehicles Exiting, veh/h	1192		1258		309		
Follow-Up Headway, s	3.186		3.186		3.186		
Ped Vol Crossing Leg, #/h	0		0		0		
Ped Cap Adj	1.000		1.000		1.000		
Approach Delay, s/veh	17.7		14.0		23.2		
Approach LOS	C		B		C		
Lane	Left	Right	Left	Right	Bypass	Left	Right
Designated Moves	LTR	R	L	LTR	R	L	TR
Assumed Moves	LTR	R	L	LTR	R	L	TR
RT Channelized	Yield						
Lane Util	0.470	0.530	0.530	0.470	0.545		
Critical Headway, s	4.293	4.113	4.293	4.113	4.293		
Entry Flow, veh/h	507	572	416	369	682	488	407
Cap Entry Lane, veh/h	784	803	896	910	910	627	652
Entry HV Adj Factor	0.961	0.961	0.962	0.962	0.962	0.961	0.961
Flow Entry, veh/h	487	550	400	355	656	469	391
Cap Entry, veh/h	753	772	862	875	875	603	627
V/C Ratio	0.647	0.712	0.464	0.405	0.750	0.778	0.624
Control Delay, s/veh	16.3	18.9	10.1	8.9	19.1	27.6	17.9
LOS	C	C	B	A	C	D	C
95th %tile Queue, veh	5	6	2	2	7	7	4

**TABLE 1**  
**Alternative 2: Traffic Queue Lengths in Feet**

Intersection/Approach	Movement	Weekday AM 50 <sup>th</sup> Percentile	Weekday AM 95 <sup>th</sup> Percentile	Weekday PM 50 <sup>th</sup> Percentile	Weekday PM 95 <sup>th</sup> Percentile	Saturday PM 50 <sup>th</sup> Percentile	Saturday PM 95 <sup>th</sup> Percentile
Lynnway and Hanson Street	--	--	--	--	--	--	--
Lynnway	NB – Through/right	216	266	59	95	438	#882
Lynnway	SB – Left	20	25	0	46	197	M#296
Lynnway	SB – Through/right	88	158	801	#1205	236	321
Hanson Street	WB – Left	13	35	~146	#304	76	118
Hanson Street	WB – Right	0	19	115	185	0	61
Lynnway and Harding Street	--	--	--	--	--	--	--
Lynnway	NB – Left	6	m27	0	7	6	M16
Lynnway	NB – Through/right	155	182	~1189	1240	~693	#858
Lynnway	SB – Left	15	m15	108	m#167	125	M162
Lynnway	SB – Through/right	~1189	m#1195	51	m70	732	M773
Harding Street	WB – Left	16	41	27	57	23	54
Harding Street	WB – Through/right	0	0	0	0	3	36
Harding Street	EB – Left/Through	3	14	20	49	13	36
Harding Street	EB – Right	0	0	0	0	0	0
Lynnway and Commercial Street	--	--	--	--	--	--	--
Lynnway	NB – Left	117	#321	308	M290	~454	M#647
Lynnway	NB – Through/right	13	31	877	M837	33	36
Lynnway	SB – Through	~380	m#965	480	#563	507	#653
Lynnway	SB – Right	0	0	54	89	0	64
Commercial Street	EB – Left	185	279	277	#467	271	#461
Commercial Street	EB – Through	65	115	16	41	55	101
Commercial Street	EB -- Right	412	#612	113	172	235	343
Lynnway, Shepard Street, and Marine Boulevard	--	--	--	--	--	--	--
Lynnway	NB – Left	4	m26	18	M64	87	M135
Lynnway	NB – Through/right	142	146	161	M#1186	362	M681
Lynnway	SB – Left	0	0	1	M8	44	M61
Lynnway	SB – Through/right	1086	#1226	42	221	14	21
Marine Boulevard	WB – Left	7	23	15	36	4	16
Marine Boulevard	WB – Through/right	0	0	4	23	4	20
Shepard Street	EB – Left/through/right	32	70	39	76	35	81
Lynnway and Kingman Street	--	--	--	--	--	--	--
Lynnway	NB – Left	25	60	55	M63	3	M11
Lynnway	NB – Through/right	181	201	85	#1182	43	106
Lynnway	SB – Left	8	m12	15	M65	0	0
Lynnway	SB – Through/right	132	406	52	88	69	79
Kingman Street	WB – Left	30	63	79	121	20	48
Kingman Street	WB – Through/right	3	39	25	75	0	0

Lynnway, Carroll Parkway, and								
Market Street	--	--	--	--	--	--	--	--
Lynnway	NB – Left	164	235	244	M258	213	#348	
Lynnway	NB – Through	4	88	39	M54	48	110	
Carroll Parkway	SB – Through	409	639	262	349	274	377	
Carroll Parkway	SB – Right	18	63	0	45	52	82	
Market Street	EB – Left	50	93	93	134	129	153	
Carroll Parkway, Nahant Road, and Lynn Shore Drive	--	--	--	--	--	--	--	--
Carroll Parkway	NB – Left	25	50	100	200	25	50	
Carroll Parkway	NB – Right	25	25	90	175	25	50	
Nahant Road	NB – Left	25	50	50	100	100	175	
Nahant Road	NB – Through	25	50	35	75	50	100	
Lynn Shore Drive	SB – Through	150	175	35	75	60	125	
Lynn Shore Drive	SB – Right	400	425	35	75	80	150	
Market Street and Broad Street	--	--	--	--	--	--	--	--
Market Street	NB – Through/left	24	55	15	26	24	M37	
Market Street	NB – Right	14	24	106	174	0	M13	
Market Street	SB – Left/through/right	96	163	174	239	171	272	
Broad Street	WB – Through/left	114	223	120	179	195	233	
Broad Street	WB – Right	14	17	0	84	14	85	
Broad Street, Washington Street, and Spring Street	--	--	--	--	--	--	--	--
Broad Street	WB – Left/through/right	81	224	52	126	28	#639	
Broad Street	EB – Through/left	21	210	60	182	0	0	
Broad Street	EB – Right	0	27	0	46	72	202	
Washington Street	NB – Left	78	134	83	#155	15	40	
Washington Street	NB – Through/right	59	107	66	121	43	83	
Washington Street	SB – Left/through/right	45	86	72	126	44	86	
Spring Street	SB -- Left/through/right	50	94	94	#179	32	68	

# **APPENDIX K**

## **Level of Service (LOS) Analysis Alternatives 4**



Lane Group	WBL	WBR	NBT	NBR	SBL	SBT
Lane Configurations	↑ ↗	↗ ↗	↑↑↑ ↗		↗	↑↑↑
Traffic Volume (vph)	20	15	925	35	150	2210
Future Volume (vph)	20	15	925	35	150	2210
Satd. Flow (prot)	1678	1501	4797	0	1678	4821
Flt Permitted	0.950				0.950	
Satd. Flow (perm)	1678	1501	4797	0	1678	4821
Satd. Flow (RTOR)			16	6		
Lane Group Flow (vph)	21	16	1020	0	159	2348
Turn Type	Prot	Perm	NA		Prot	NA
Protected Phases	8		2		1	6
Permitted Phases			8			
Total Split (s)	31.0	31.0	60.0		29.0	89.0
Total Lost Time (s)	5.0	5.0	5.0		5.0	4.0
Act Efect Green (s)	18.4	18.4	67.4		24.0	99.0
Actuated g/C Ratio	0.15	0.15	0.56		0.20	0.82
v/c Ratio	0.08	0.07	0.38		0.47	0.59
Control Delay	39.5	16.8	17.1		27.8	1.6
Queue Delay	0.0	0.0	0.0		0.0	0.0
Total Delay	39.5	16.8	17.1		27.8	1.6
LOS	D	B	B		C	A
Approach Delay	29.7		17.1			3.3
Approach LOS	C		B			A
Queue Length 50th (ft)	13	0	193		96	30
Queue Length 95th (ft)	35	19	232	m146		59
Internal Link Dist (ft)	376		617			1043
Turn Bay Length (ft)				400		
Base Capacity (vph)	363	337	2696		335	3977
Starvation Cap Reductn	0	0	0		0	0
Spillback Cap Reductn	0	0	0		0	0
Storage Cap Reductn	0	0	0		0	0
Reduced v/c Ratio	0.06	0.05	0.38		0.47	0.59

#### Intersection Summary

Cycle Length: 120

Actuated Cycle Length: 120

Offset: 0 (0%), Referenced to phase 2:NBT and 6:SBT, Start of Green, Master Intersection

Control Type: Actuated-Coordinated

Maximum v/c Ratio: 0.59

Intersection Signal Delay: 7.5

Intersection LOS: A

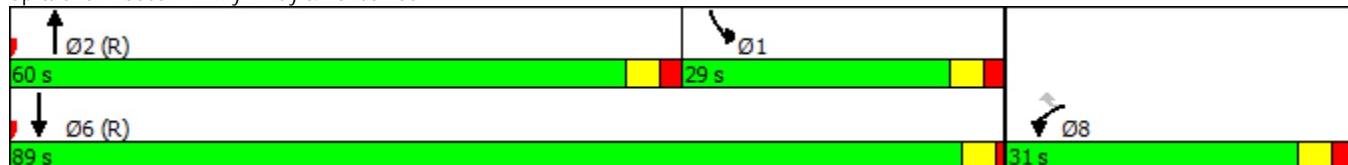
Intersection Capacity Utilization 56.9%

ICU Level of Service B

Analysis Period (min) 15

m Volume for 95th percentile queue is metered by upstream signal.

Splits and Phases: 2: Lynnway & Hanson St



Lane Group	NBL	NBT	NBR	SBL	SBT	SBR	NEL	NET	NER	SWL	SWT	SWR
Lane Configurations	↑	↑			↑	↑	↑	↑↑↑		↑	↑↑↑	
Traffic Volume (vph)	25	0	5	5	0	5	25	900	20	70	2335	15
Future Volume (vph)	25	0	5	5	0	5	25	900	20	70	2335	15
Satd. Flow (prot)	1678	1501	0	0	1678	1501	1678	4807	0	1678	4816	0
Flt Permitted	0.754				0.754		0.950			0.950		
Satd. Flow (perm)	1332	1501	0	0	1332	1501	1678	4807	0	1678	4816	0
Satd. Flow (RTOR)		203				64		4			1	
Lane Group Flow (vph)	27	5	0	0	5	5	27	977	0	74	2497	0
Turn Type	Perm	NA		Perm	NA	Perm	Prot	NA		Prot	NA	
Protected Phases		8			4		5	2		1	6	
Permitted Phases	8				4		4					
Total Split (s)	32.0	32.0		32.0	32.0	32.0	12.0	71.0		17.0	76.0	
Total Lost Time (s)	6.0	6.0			6.0	6.0	5.0	5.0		5.0	5.0	
Act Efect Green (s)	18.0	18.0			17.8	17.8	7.0	84.1		10.1	90.6	
Actuated g/C Ratio	0.15	0.15			0.15	0.15	0.06	0.70		0.08	0.76	
v/c Ratio	0.14	0.01			0.03	0.02	0.28	0.29		0.52	0.69	
Control Delay	41.0	0.0			37.4	0.2	72.7	3.0		66.5	4.6	
Queue Delay	0.0	0.0			0.0	0.0	0.0	0.0		0.0	0.0	
Total Delay	41.0	0.0			37.4	0.2	72.7	3.0		66.5	4.6	
LOS	D	A			D	A	E	A		E	A	
Approach Delay		34.6			18.8			4.9			6.4	
Approach LOS		C			B			A			A	
Queue Length 50th (ft)	17	0			3	0	22	24		59	158	
Queue Length 95th (ft)	43	0			14	0	55	30	m67	170		
Internal Link Dist (ft)		148			94			1043			1859	
Turn Bay Length (ft)							300			300		
Base Capacity (vph)	288	484			288	375	97	3370		167	3636	
Starvation Cap Reductn	0	0			0	0	0	0		0	0	
Spillback Cap Reductn	0	0			0	0	0	0		0	0	
Storage Cap Reductn	0	0			0	0	0	0		0	0	
Reduced v/c Ratio	0.09	0.01			0.02	0.01	0.28	0.29		0.44	0.69	

#### Intersection Summary

Cycle Length: 120

Actuated Cycle Length: 120

Offset: 2 (2%), Referenced to phase 2:NET and 6:SWT, Start of Green

Control Type: Actuated-Coordinated

Maximum v/c Ratio: 0.69

Intersection Signal Delay: 6.2

Intersection LOS: A

Intersection Capacity Utilization 73.6%

ICU Level of Service D

Analysis Period (min) 15

m Volume for 95th percentile queue is metered by upstream signal.

Splits and Phases: 3: Lynnway & Harding St



Lane Group	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations	↑	↑↑↑			↑↑↑	↑				↑	↑	↑
Traffic Volume (vph)	260	765	10	0	1990	275	0	0	0	245	95	535
Future Volume (vph)	260	765	10	0	1990	275	0	0	0	245	95	535
Satd. Flow (prot)	1678	4812	0	0	4821	1501	0	0	0	1678	1766	1501
Flt Permitted	0.950									0.950		
Satd. Flow (perm)	1678	4812	0	0	4821	1501	0	0	0	1678	1766	1501
Satd. Flow (RTOR)			4			164						9
Lane Group Flow (vph)	276	824	0	0	2114	292	0	0	0	260	101	568
Turn Type	Prot	NA			NA	pt+ov				Split	NA	pt+ov
Protected Phases	5	2			6	6 4				4	4	4 5
Permitted Phases												
Total Split (s)	27.0	90.0			63.0					30.0	30.0	
Total Lost Time (s)	4.0	4.0			4.0					4.0	4.0	
Act Efect Green (s)	22.1	86.0			59.9	89.9				26.0	26.0	52.1
Actuated g/C Ratio	0.18	0.72			0.50	0.75				0.22	0.22	0.43
v/c Ratio	0.90	0.24			0.88	0.25				0.72	0.26	0.87
Control Delay	61.4	7.9			12.6	1.5				55.9	41.3	45.4
Queue Delay	0.0	0.0			0.0	0.0				0.0	0.0	0.0
Total Delay	61.4	7.9			12.6	1.5				55.9	41.3	45.4
LOS	E	A			B	A				E	D	D
Approach Delay		21.3			11.2					47.9		
Approach LOS		C			B					D		
Queue Length 50th (ft)	186	43			133	14				188	65	381
Queue Length 95th (ft)	#360	62			122	5				#287	117	#595
Internal Link Dist (ft)		1859			1063			493			489	
Turn Bay Length (ft)		1000				300				200		200
Base Capacity (vph)	321	3449			2407	1165				363	382	667
Starvation Cap Reductn	0	0			0	0				0	0	0
Spillback Cap Reductn	0	0			0	0				0	0	0
Storage Cap Reductn	0	0			0	0				0	0	0
Reduced v/c Ratio	0.86	0.24			0.88	0.25				0.72	0.26	0.85

#### Intersection Summary

Cycle Length: 120

Actuated Cycle Length: 120

Offset: 91 (76%), Referenced to phase 2:EBT and 6:WBT, Start of Green

Control Type: Actuated-Coordinated

Maximum v/c Ratio: 0.90

Intersection Signal Delay: 21.4

Intersection LOS: C

Intersection Capacity Utilization 79.7%

ICU Level of Service D

Analysis Period (min) 15

# 95th percentile volume exceeds capacity, queue may be longer.

Queue shown is maximum after two cycles.

Splits and Phases: 4: Commercial St & Lynnway



Lane Group	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations	↑	↑↑↑		↑	↑↑↑		↑	↑			↑	
Traffic Volume (vph)	50	955	20	70	2215	45	10	0	5	35	10	15
Future Volume (vph)	50	955	20	70	2215	45	10	0	5	35	10	15
Satd. Flow (prot)	1678	4807	0	1678	4807	0	1678	1501	0	0	1658	0
Flt Permitted	0.950				0.950			0.763				0.819
Satd. Flow (perm)	1678	4807	0	1678	4807	0	1347	1501	0	0	1397	0
Satd. Flow (RTOR)		4			4			248			13	
Lane Group Flow (vph)	53	1036	0	74	2401	0	11	5	0	0	64	0
Turn Type	Prot	NA		Prot	NA		Perm	NA		Perm	NA	
Protected Phases	5	2		1	6			8			4	
Permitted Phases							8				4	
Total Split (s)	16.0	72.0		16.0	72.0		32.0	32.0		32.0	32.0	
Total Lost Time (s)	4.0	6.0		4.0	6.0		6.0	6.0			6.0	
Act Efect Green (s)	9.8	84.6		10.1	84.6		15.3	15.3			15.3	
Actuated g/C Ratio	0.08	0.70		0.08	0.70		0.13	0.13			0.13	
v/c Ratio	0.39	0.31		0.52	0.71		0.06	0.01			0.34	
Control Delay	54.8	1.4		49.2	7.8		40.7	0.0			40.2	
Queue Delay	0.0	0.0		0.0	0.0		0.0	0.0			0.0	
Total Delay	54.8	1.4		49.2	7.8		40.7	0.0			40.2	
LOS	D	A		D	A		D	A			D	
Approach Delay		4.0			9.1			28.0			40.2	
Approach LOS		A			A			C			D	
Queue Length 50th (ft)	44	9		56	113		8	0			38	
Queue Length 95th (ft)	m82	19		m92	175		23	0			72	
Internal Link Dist (ft)		1063			584			95			161	
Turn Bay Length (ft)	250			400								
Base Capacity (vph)	167	3390		167	3390		291	519			312	
Starvation Cap Reductn	0	0		0	40		0	0			0	
Spillback Cap Reductn	0	0		0	0		0	0			0	
Storage Cap Reductn	0	0		0	0		0	0			0	
Reduced v/c Ratio	0.32	0.31		0.44	0.72		0.04	0.01			0.21	

#### Intersection Summary

Cycle Length: 120

Actuated Cycle Length: 120

Offset: 62 (52%), Referenced to phase 2:EBT and 6:WBT, Start of Green

Control Type: Actuated-Coordinated

Maximum v/c Ratio: 0.71

Intersection Signal Delay: 8.2

Intersection LOS: A

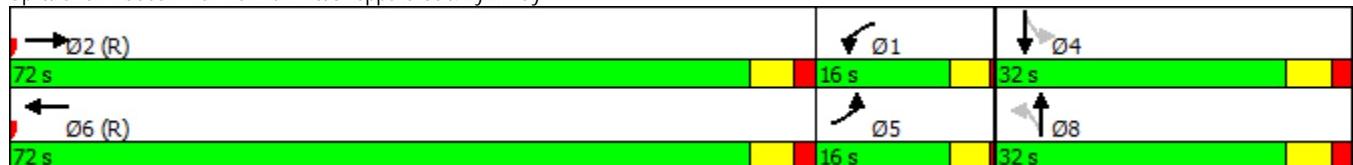
Intersection Capacity Utilization 72.3%

ICU Level of Service C

Analysis Period (min) 15

m Volume for 95th percentile queue is metered by upstream signal.

Splits and Phases: 5: Marine Blvd/Sheppard St & Lynnway





Lane Group	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations		↑↑↑			↑↑↑					↑↑		
Traffic Volume (vph)	0	1010	50	50	2170	95	20	10	20	30	10	20
Future Volume (vph)	0	1010	50	50	2170	95	20	10	20	30	10	20
Satd. Flow (prot)	0	4788	0	1678	4792	0	1678	1593	0	1678	1593	0
Flt Permitted					0.950			0.736			0.736	
Satd. Flow (perm)	0	4788	0	1678	4792	0	1300	1593	0	1300	1593	0
Satd. Flow (RTOR)		11			14			21			13	
Lane Group Flow (vph)	0	1126	0	53	2407	0	21	32	0	32	32	0
Turn Type		NA		Prot	NA		Perm	NA		Perm	NA	
Protected Phases		2		1	6			8				4
Permitted Phases							8				4	
Total Split (s)		74.0		16.0	90.0		30.0	30.0		30.0	30.0	
Total Lost Time (s)		4.0		4.0	4.0		4.0	4.0		4.0	4.0	
Act Efct Green (s)		85.5		9.0	96.6		18.1	18.1		18.1	18.1	
Actuated g/C Ratio		0.71		0.08	0.80		0.15	0.15		0.15	0.15	
v/c Ratio		0.33		0.42	0.62		0.11	0.12		0.16	0.13	
Control Delay		1.5		74.0	1.3		40.1	21.0		41.7	27.5	
Queue Delay		0.0		0.0	0.3		0.0	0.0		0.0	0.0	
Total Delay		1.5		74.0	1.5		40.1	21.0		41.7	27.5	
LOS	A		E	A		D	C		D	C		
Approach Delay		1.5			3.1			28.6			34.6	
Approach LOS		A			A			C			C	
Queue Length 50th (ft)		30		36	4		13	7		20	12	
Queue Length 95th (ft)		20		m50	4		36	34		49	39	
Internal Link Dist (ft)		584			494			259			262	
Turn Bay Length (ft)				150								
Base Capacity (vph)		3416		167	3861		281	361		281	355	
Starvation Cap Reductn		0		0	640		0	0		0	0	
Spillback Cap Reductn		0		0	57		0	0		0	0	
Storage Cap Reductn		0		0	0		0	0		0	0	
Reduced v/c Ratio		0.33		0.32	0.75		0.07	0.09		0.11	0.09	

#### Intersection Summary

Cycle Length: 120

Actuated Cycle Length: 120

Offset: 75 (63%), Referenced to phase 2:EBT and 6:WBT, Start of Green

Control Type: Actuated-Coordinated

Maximum v/c Ratio: 0.62

Intersection Signal Delay: 3.5

Intersection LOS: A

Intersection Capacity Utilization 59.9%

ICU Level of Service B

Analysis Period (min) 15

m Volume for 95th percentile queue is metered by upstream signal.

Splits and Phases: 15: Blossom St & Lynnway



Lane Group	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations	↑	↑↑↑		↑	↑↑↑		↑	↑				
Traffic Volume (vph)	55	975	40	95	2240	150	45	5	50	0	0	0
Future Volume (vph)	55	975	40	95	2240	150	45	5	50	0	0	0
Satd. Flow (prot)	1678	4792	0	1678	4778	0	1678	1524	0	0	0	0
Flt Permitted	0.950				0.950			0.950				
Satd. Flow (perm)	1678	4792	0	1678	4778	0	1678	1524	0	0	0	0
Satd. Flow (RTOR)		8				16			53			
Lane Group Flow (vph)	58	1079	0	101	2539	0	48	58	0	0	0	0
Turn Type	Prot	NA		Prot	NA		Split	NA				
Protected Phases	5	2		1	6		8	8				
Permitted Phases												
Total Split (s)	12.0	70.0		20.0	78.0		30.0	30.0				
Total Lost Time (s)	4.0	4.0		4.0	4.0		4.0	4.0				
Act Efect Green (s)	7.6	79.5		12.2	86.9		18.2	18.2				
Actuated g/C Ratio	0.06	0.66		0.10	0.72		0.15	0.15				
v/c Ratio	0.55	0.34		0.59	0.73		0.19	0.21				
Control Delay	64.2	13.9		80.0	7.6		42.0	13.5				
Queue Delay	0.0	0.0		0.0	0.0		0.0	0.0				
Total Delay	64.2	13.9		80.0	7.6		42.0	13.5				
LOS	E	B		E	A		D	B				
Approach Delay		16.5			10.3			26.4				
Approach LOS		B			B			C				
Queue Length 50th (ft)	48	132		81	553		30	3				
Queue Length 95th (ft)	#97	173		140	142		64	39				
Internal Link Dist (ft)		494			544			258				69
Turn Bay Length (ft)				300								
Base Capacity (vph)	111	3178		223	3465		363	371				
Starvation Cap Reductn	0	0		0	0		0	0				
Spillback Cap Reductn	0	0		0	0		0	0				
Storage Cap Reductn	0	0		0	0		0	0				
Reduced v/c Ratio	0.52	0.34		0.45	0.73		0.13	0.16				

#### Intersection Summary

Cycle Length: 120

Actuated Cycle Length: 120

Offset: 53 (44%), Referenced to phase 2:EBT and 6:WBT, Start of Green

Control Type: Actuated-Coordinated

Maximum v/c Ratio: 0.73

Intersection Signal Delay: 12.6

Intersection LOS: B

Intersection Capacity Utilization 64.3%

ICU Level of Service C

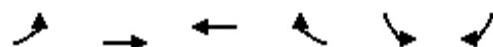
Analysis Period (min) 15

# 95th percentile volume exceeds capacity, queue may be longer.

Queue shown is maximum after two cycles.

Splits and Phases: 6: Kingman St & Lynnway





Lane Group	EBL	EBT	WBT	WBR	SBL	SBR
Lane Configurations	↑↑	↑↑↑	↑↑↑	↑	↑↑	
Traffic Volume (vph)	425	600	1515	200	160	25
Future Volume (vph)	425	600	1515	200	160	25
Satd. Flow (prot)	3255	4821	4821	1501	3217	0
Flt Permitted	0.950				0.959	
Satd. Flow (perm)	3255	4821	4821	1501	3217	0
Satd. Flow (RTOR)				213	13	
Lane Group Flow (vph)	452	638	1610	213	197	0
Turn Type	Prot	NA	NA	Perm	Prot	
Protected Phases	5	2	6		7	
Permitted Phases				6		
Total Split (s)	35.0	93.0	58.0	58.0	27.0	
Total Lost Time (s)	5.0	4.0	4.0	4.0	4.0	
Act Efct Green (s)	22.3	98.5	71.2	71.2	13.5	
Actuated g/C Ratio	0.19	0.82	0.59	0.59	0.11	
v/c Ratio	0.75	0.16	0.56	0.22	0.53	
Control Delay	38.2	4.1	17.0	2.5	54.1	
Queue Delay	0.0	0.0	0.0	0.0	0.0	
Total Delay	38.2	4.1	17.0	2.5	54.1	
LOS	D	A	B	A	D	
Approach Delay		18.3	15.3		54.1	
Approach LOS		B	B		D	
Queue Length 50th (ft)	151	75	252	0	78	
Queue Length 95th (ft)	201	113	373	38	118	
Internal Link Dist (ft)		431	1171		315	
Turn Bay Length (ft)			600			
Base Capacity (vph)	813	3957	2862	977	627	
Starvation Cap Reductn	0	0	0	0	0	
Spillback Cap Reductn	0	0	0	0	0	
Storage Cap Reductn	0	0	0	0	0	
Reduced v/c Ratio	0.56	0.16	0.56	0.22	0.31	

#### Intersection Summary

Cycle Length: 120

Actuated Cycle Length: 120

Offset: 43 (36%), Referenced to phase 2:EBT and 6:WBT, Start of Green

Control Type: Actuated-Coordinated

Maximum v/c Ratio: 0.75

Intersection Signal Delay: 18.8

Intersection LOS: B

Intersection Capacity Utilization 58.1%

ICU Level of Service B

Analysis Period (min) 15

Splits and Phases: 7: Lynnway/Carroll Parkway & Market St





Lane Group	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations					↑↑	↑		↑↑	↑		↑↑	
Traffic Volume (vph)	0	0	0	53	500	180	10	305	310	155	135	160
Future Volume (vph)	0	0	0	53	500	180	10	305	310	155	135	160
Satd. Flow (prot)	0	0	0	0	3339	1501	0	3349	1501	0	3124	0
Flt Permitted						0.995			0.936		0.707	
Satd. Flow (perm)	0	0	0	0	3339	1501	0	3141	1501	0	2247	0
Satd. Flow (RTOR)						190			329		101	
Lane Group Flow (vph)	0	0	0	0	587	191	0	335	329	0	478	0
Turn Type					Split	NA	Perm	Perm	NA	pt+ov	Perm	NA
Protected Phases					3	3			2	2 3		6
Permitted Phases							3	2			6	
Total Split (s)					42.0	42.0	51.0	51.0	51.0	51.0	51.0	
Total Lost Time (s)						4.0	4.0		5.0		5.0	
Act Efect Green (s)						30.1	30.1	64.7	100.8		64.7	
Actuated g/C Ratio						0.25	0.25	0.54	0.84		0.54	
v/c Ratio						0.70	0.37	0.20	0.25		0.38	
Control Delay						42.2	11.7	5.6	1.4		17.0	
Queue Delay						0.0	0.0	0.0	0.5		0.0	
Total Delay						42.2	11.7	5.6	1.9		17.0	
LOS						D	B	A	A		B	
Approach Delay						34.7			3.8		17.0	
Approach LOS						C		A			B	
Queue Length 50th (ft)						206	19	24	18		103	
Queue Length 95th (ft)						259	118	33	0		169	
Internal Link Dist (ft)		27				705			315		249	
Turn Bay Length (ft)							150					
Base Capacity (vph)						1057	605	1692	1336		1257	
Starvation Cap Reductn						0	0	0	633		0	
Spillback Cap Reductn						0	0	0	0		0	
Storage Cap Reductn						0	0	0	0		0	
Reduced v/c Ratio						0.56	0.32	0.20	0.47		0.38	

#### Intersection Summary

Cycle Length: 120

Actuated Cycle Length: 120

Offset: 11 (9%), Referenced to phase 2:NBTL and 6:SBTL, Start of Green

Control Type: Actuated-Coordinated

Maximum v/c Ratio: 0.70

Intersection Signal Delay: 19.6

Intersection LOS: B

Intersection Capacity Utilization 49.9%

ICU Level of Service A

Analysis Period (min) 15

Splits and Phases: 9: Market St & Broad St





Lane Group	EBL	EBT	EBR	WBL	WBT	WBR2	NBL2	NBL	NBT	NBR	SBL	SBT
Lane Configurations												
Traffic Volume (vph)	50	220	205	35	580	30	100	0	70	15	20	20
Future Volume (vph)	50	220	205	35	580	30	100	0	70	15	20	20
Satd. Flow (prot)	0	1750	1501	0	3322	0	0	1678	1718	0	0	1660
Flt Permitted												0.861
Satd. Flow (perm)	0	1402	1501	0	3059	0	0	1355	1718	0	0	1452
Satd. Flow (RTOR)				218		118			8			
Lane Group Flow (vph)	0	287	218	0	685	0	0	106	90	0	0	63
Turn Type	Perm	NA	Perm	Perm	NA		Perm	Perm	NA		custom	NA
Protected Phases		2			6				8			
Permitted Phases	2		2	6				8	8		4	4
Total Split (s)	53.0	53.0	53.0	53.0	53.0			24.0	24.0		24.0	24.0
Total Lost Time (s)			7.0	7.0		7.0			5.0	5.0		6.0
Act Efect Green (s)	74.5	74.5			74.5				14.3	14.3		13.3
Actuated g/C Ratio	0.62	0.62			0.62				0.12	0.12		0.11
v/c Ratio	0.33	0.21			0.35				0.66	0.43		0.39
Control Delay	5.8	0.5			12.2				69.0	49.7		55.4
Queue Delay	0.0	0.0			0.0				0.0	0.0		0.0
Total Delay	5.8	0.5			12.2				69.0	49.7		55.4
LOS	A	A			B				E	D		E
Approach Delay	3.5				12.2					60.1		55.4
Approach LOS	A				B					E		E
Queue Length 50th (ft)	28	0			90				79	59		46
Queue Length 95th (ft)	66	0			238				136	109		89
Internal Link Dist (ft)	705				409					1177		214
Turn Bay Length (ft)								200				
Base Capacity (vph)	870	1014			1944				214	278		217
Starvation Cap Reductn	0	0			0				0	0		0
Spillback Cap Reductn	0	0			0				0	0		0
Storage Cap Reductn	0	0			0				0	0		0
Reduced v/c Ratio	0.33	0.21			0.35				0.50	0.32		0.29

#### Intersection Summary

Cycle Length: 120

Actuated Cycle Length: 120

Offset: 16 (13%), Referenced to phase 2:EBTL and 6:WBT, Start of Green

Control Type: Actuated-Coordinated

Maximum v/c Ratio: 0.66

Intersection Signal Delay: 19.8

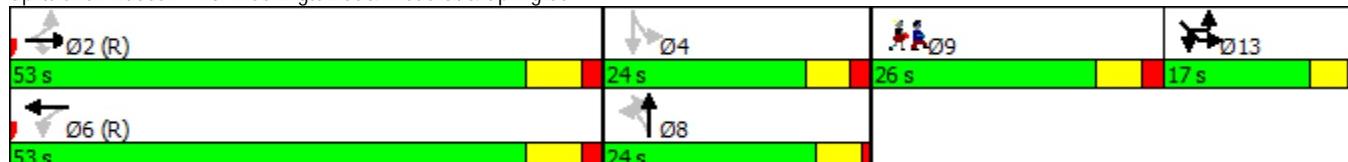
Intersection LOS: B

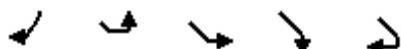
Intersection Capacity Utilization 74.0%

ICU Level of Service D

Analysis Period (min) 15

Splits and Phases: 10: Washington St & Broad St & Spring St





Lane Group	SBR	SEL2	SEL	SER	SER2	Ø9
Lane Configurations						
Traffic Volume (vph)	20	5	60	120	30	
Future Volume (vph)	20	5	60	120	30	
Satd. Flow (prot)	0	0	1678	1501	0	
Flt Permitted			0.950			
Satd. Flow (perm)	0	0	1678	1501	0	
Satd. Flow (RTOR)			145			
Lane Group Flow (vph)	0	0	69	160	0	
Turn Type		Prot	Prot	Prot		
Protected Phases		13	13	13		9
Permitted Phases						
Total Split (s)	17.0	17.0	17.0	26.0		
Total Lost Time (s)		4.0	4.0			
Act Efect Green (s)		10.0	10.0			
Actuated g/C Ratio		0.08	0.08			
v/c Ratio		0.50	0.62			
Control Delay		64.0	21.7			
Queue Delay		0.0	0.0			
Total Delay		64.0	21.7			
LOS		E	C			
Approach Delay		34.4				
Approach LOS		C				
Queue Length 50th (ft)		52	11			
Queue Length 95th (ft)		99	78			
Internal Link Dist (ft)		258				
Turn Bay Length (ft)		150				
Base Capacity (vph)		181	291			
Starvation Cap Reductn		0	0			
Spillback Cap Reductn		0	0			
Storage Cap Reductn		0	0			
Reduced v/c Ratio		0.38	0.55			
Intersection Summary						

Intersection							
Approach	WB		SB		NE		
Entry Lanes		2		2		2	
Conflicting Circle Lanes		2		2		2	
Adj Approach Flow, veh/h	1608		832		547		
Demand Flow Rate, veh/h	1672		865		569		
Vehicles Circulating, veh/h	410		80		723		
Vehicles Exiting, veh/h	882		2002		80		
Follow-Up Headway, s	3.186		3.186		3.186		
Ped Vol Crossing Leg, #/h	0		0		0		
Ped Cap Adj	1.000		1.000		1.000		
Approach Delay, s/veh	55.1		6.6		11.9		
Approach LOS	F		A		B		
Lane	Left	Right	Left	Right	Bypass	Left	Right
Designated Moves	LTR	R	L	LTR	R	L	LTR
Assumed Moves	LTR	R	L	LTR	R	L	LTR
RT Channelized					Yield		
Lane Util	0.470	0.530	0.530	0.470		0.531	0.469
Critical Headway, s	4.293	4.113	4.293	4.113		4.293	4.113
Entry Flow, veh/h	786	886	383	340	142	302	267
Cap Entry Lane, veh/h	831	848	1064	1068	1068	657	681
Entry HV Adj Factor	0.962	0.962	0.962	0.961	0.962	0.960	0.963
Flow Entry, veh/h	756	852	368	327	137	290	257
Cap Entry, veh/h	799	816	1023	1026	1027	631	656
V/C Ratio	0.946	1.045	0.360	0.318	0.133	0.460	0.392
Control Delay, s/veh	42.5	66.1	7.3	6.7	4.7	12.8	10.9
LOS	E	F	A	A	A	B	B
95th %tile Queue, veh	14	20	2	1	0	2	2





Lane Group	WBL	WBR	NBT	NBR	SBL	SBT
Lane Configurations	↑	↑	↑↑↑		↑	↑↑↑
Traffic Volume (vph)	75	100	2140	50	225	1065
Future Volume (vph)	75	100	2140	50	225	1065
Satd. Flow (prot)	1711	1531	4901	0	1711	4916
Flt Permitted	0.950				0.950	
Satd. Flow (perm)	1711	1531	4901	0	1711	4916
Satd. Flow (RTOR)		106	4			
Lane Group Flow (vph)	80	106	2327	0	239	1132
Turn Type	Prot	Perm	NA		Prot	NA
Protected Phases	8		2		1	6
Permitted Phases			8			
Total Split (s)	35.0	35.0	57.0		28.0	85.0
Total Lost Time (s)	5.0	5.0	5.0		5.0	4.0
Act Effct Green (s)	15.8	15.8	66.2		23.0	95.2
Actuated g/C Ratio	0.13	0.13	0.55		0.19	0.79
v/c Ratio	0.36	0.36	0.86		0.73	0.29
Control Delay	48.9	10.8	28.6		37.8	1.9
Queue Delay	0.0	0.0	3.0		0.0	0.0
Total Delay	48.9	10.8	31.7		37.8	1.9
LOS	D	B	C		D	A
Approach Delay	27.2		31.7			8.2
Approach LOS	C		C			A
Queue Length 50th (ft)	60	0	484		172	24
Queue Length 95th (ft)	97	47	#793		#292	37
Internal Link Dist (ft)	376		617			1043
Turn Bay Length (ft)					400	
Base Capacity (vph)	427	462	2703		327	3898
Starvation Cap Reductn	0	0	277		0	0
Spillback Cap Reductn	0	0	0		0	0
Storage Cap Reductn	0	0	0		0	0
Reduced v/c Ratio	0.19	0.23	0.96		0.73	0.29

#### Intersection Summary

Cycle Length: 120

Actuated Cycle Length: 120

Offset: 0 (0%), Referenced to phase 2:NBT and 6:SBT, Start of Green, Master Intersection

Control Type: Actuated-Coordinated

Maximum v/c Ratio: 0.86

Intersection Signal Delay: 23.2

Intersection LOS: C

Intersection Capacity Utilization 74.4%

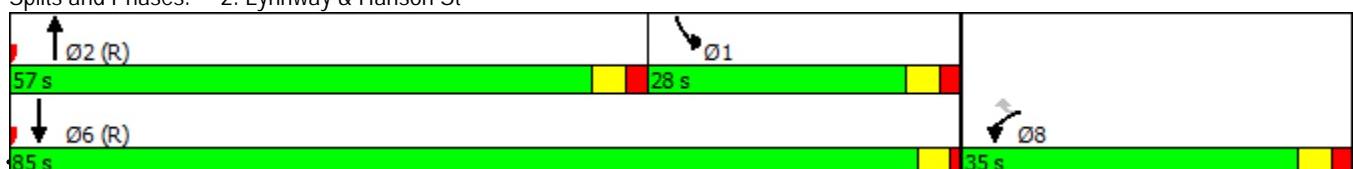
ICU Level of Service D

Analysis Period (min) 15

# 95th percentile volume exceeds capacity, queue may be longer.

Queue shown is maximum after two cycles.

Splits and Phases: 2: Lynnway & Hanson St



Lynnway-Route 1A-Carroll Parkway Study  
3: Lynnway & Harding St

Alternative 4: 2040 PM

5:00 pm

	↑	↑	↗	↖	↓	↙	↗	↖	↗	↖	↙	↖
Lane Group	NBL	NBT	NBR	SBL	SBT	SBR	NEL	NET	NER	SWL	SWT	SWR
Lane Configurations	↑	↑			↑	↑	↑	↑↑↑		↑	↑↑↑	
Traffic Volume (vph)	40	0	40	30	0	5	45	2230	65	165	1195	65
Future Volume (vph)	40	0	40	30	0	5	45	2230	65	165	1195	65
Satd. Flow (prot)	1711	1531	0	0	1711	1531	1711	4896	0	1711	4876	0
Flt Permitted	0.736				0.729			0.950			0.950	
Satd. Flow (perm)	1325	1531	0	0	1313	1531	1711	4896	0	1711	4876	0
Satd. Flow (RTOR)		166				64		5			11	
Lane Group Flow (vph)	43	43	0	0	32	5	48	2438	0	175	1339	0
Turn Type	Perm	NA		Perm	NA	Perm	Prot	NA		Prot	NA	
Protected Phases		8				4		5	2		1	6
Permitted Phases	8				4		4					
Total Split (s)	32.0	32.0		32.0	32.0	32.0	16.0	67.0		21.0	72.0	
Total Lost Time (s)	6.0	6.0			6.0	6.0	5.0	5.0		5.0	5.0	
Act Effct Green (s)	18.2	18.2			18.2	18.2	10.1	73.0		15.1	81.4	
Actuated g/C Ratio	0.15	0.15			0.15	0.15	0.08	0.61		0.13	0.68	
v/c Ratio	0.21	0.12			0.16	0.02	0.34	0.82		0.81	0.40	
Control Delay	42.9	0.6			41.6	0.2	49.9	7.5		73.3	2.3	
Queue Delay	0.0	0.0			0.0	0.0	0.0	0.0		0.0	0.0	
Total Delay	42.9	0.6			41.6	0.2	49.9	7.5		73.3	2.3	
LOS	D	A			D	A	D	A		E	A	
Approach Delay		21.8			36.0			8.3			10.5	
Approach LOS		C			D			A			B	
Queue Length 50th (ft)	27	0			20	0	40	642		143	38	
Queue Length 95th (ft)	60	0			49	0	m50	#111		m#197	43	
Internal Link Dist (ft)		148			94			1043			1850	
Turn Bay Length (ft)							300			300		
Base Capacity (vph)	287	461			284	381	156	2981		228	3310	
Starvation Cap Reductn	0	0			0	0	0	0		0	0	
Spillback Cap Reductn	0	0			0	0	0	0		0	0	
Storage Cap Reductn	0	0			0	0	0	0		0	0	
Reduced v/c Ratio	0.15	0.09			0.11	0.01	0.31	0.82		0.77	0.40	

Intersection Summary

Cycle Length: 120

Actuated Cycle Length: 120

Offset: 12 (10%), Referenced to phase 2:NET and 6:SWT, Start of Green

Control Type: Actuated-Coordinated

Maximum v/c Ratio: 0.82

Intersection Signal Delay: 9.7

Intersection LOS: A

Intersection Capacity Utilization 77.0%

ICU Level of Service D

Analysis Period (min) 15

# 95th percentile volume exceeds capacity, queue may be longer.

Queue shown is maximum after two cycles.

m Volume for 95th percentile queue is metered by upstream signal.

Splits and Phases: 3: Lynnway & Harding St



# Lynnway-Route 1A-Carroll Parkway Study

## 4: Commercial St & Lynnway

Alternative 4: 2040 PM

5:00 pm



Lane Group	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations	↑	↑↑↑			↑↑↑	↑				↑	↑	↑
Traffic Volume (vph)	540	1950	5	0	1095	295	0	0	0	340	25	285
Future Volume (vph)	540	1950	5	0	1095	295	0	0	0	340	25	285
Satd. Flow (prot)	1711	4916	0	0	4916	1531	0	0	0	1711	1801	1531
Flt Permitted	0.950									0.950		
Satd. Flow (perm)	1711	4916	0	0	4916	1531	0	0	0	1711	1801	1531
Satd. Flow (RTOR)			1			313						9
Lane Group Flow (vph)	574	2077	0	0	1163	313	0	0	0	361	27	303
Turn Type	Prot	NA			NA	Perm				Perm	NA	pt+ov
Protected Phases	5	2			6					4	4	5
Permitted Phases					6					4		
Total Split (s)	50.0	86.0			36.0	36.0				34.0	34.0	
Total Lost Time (s)	4.0	4.0			4.0	4.0				4.0	4.0	
Act Effct Green (s)	43.4	83.8			36.3	36.3				28.2	28.2	75.7
Actuated g/C Ratio	0.36	0.70			0.30	0.30				0.24	0.24	0.63
v/c Ratio	0.93	0.61			0.78	0.46				0.90	0.06	0.31
Control Delay	39.6	4.2			24.0	6.4				70.2	35.0	10.2
Queue Delay	0.0	0.0			0.0	0.0				0.0	0.0	0.0
Total Delay	39.6	4.2			24.0	6.4				70.2	35.0	10.2
LOS	D	A			C	A				E	C	B
Approach Delay	11.9				20.3					42.5		
Approach LOS	B				C					D		
Queue Length 50th (ft)	238	25			205	64				267	16	86
Queue Length 95th (ft)	m#591	27			#287	90				#427	41	131
Internal Link Dist (ft)	1850				1085			493		489		
Turn Bay Length (ft)	800				300				200		200	
Base Capacity (vph)	655	3432			1488	681			427	450	994	
Starvation Cap Reductn	0	0			0	0			0	0	0	
Spillback Cap Reductn	0	0			0	0			0	0	0	
Storage Cap Reductn	0	0			0	0			0	0	0	
Reduced v/c Ratio	0.88	0.61			0.78	0.46			0.85	0.06	0.30	

### Intersection Summary

Cycle Length: 120

Actuated Cycle Length: 120

Offset: 102 (85%), Referenced to phase 2:EBT and 6:WBT, Start of Green

Control Type: Actuated-Coordinated

Maximum v/c Ratio: 0.93

Intersection Signal Delay: 18.9

Intersection LOS: B

Intersection Capacity Utilization 81.3%

ICU Level of Service D

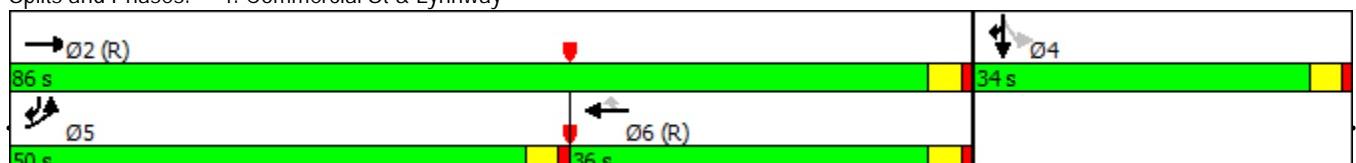
Analysis Period (min) 15

# 95th percentile volume exceeds capacity, queue may be longer.

Queue shown is maximum after two cycles.

m Volume for 95th percentile queue is metered by upstream signal.

Splits and Phases: 4: Commercial St & Lynnway



Lynnway-Route 1A-Carroll Parkway Study  
5: Marine Blvd/Sheppard St & Lynnway

Alternative 4: 2040 PM

5:00 pm

Lane Group	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations	↑	↑↑↓		↑	↑↑↓		↑	↑			↔	
Traffic Volume (vph)	175	2105	20	35	1345	20	20	5	10	40	5	25
Future Volume (vph)	175	2105	20	35	1345	20	20	5	10	40	5	25
Satd. Flow (prot)	1711	4911	0	1711	4906	0	1711	1615	0	0	1664	0
Flt Permitted	0.950			0.950			0.732				0.814	
Satd. Flow (perm)	1711	4911	0	1711	4906	0	1318	1615	0	0	1394	0
Satd. Flow (RTOR)		2			2			11			20	
Lane Group Flow (vph)	186	2258	0	37	1450	0	21	16	0	0	75	0
Turn Type	Prot	NA		Prot	NA		Perm	NA		Perm	NA	
Protected Phases	5	2		1	6				8			4
Permitted Phases							8				4	
Total Split (s)	30.0	80.0		13.0	63.0		27.0	27.0		27.0	27.0	
Total Lost Time (s)	6.0	6.0		6.0	6.0		6.0	6.0			6.0	
Act Effct Green (s)	19.8	92.3		7.0	73.1		11.7	11.7			11.7	
Actuated g/C Ratio	0.16	0.77		0.06	0.61		0.10	0.10			0.10	
v/c Ratio	0.66	0.60		0.37	0.49		0.17	0.10			0.49	
Control Delay	45.6	1.5		54.6	9.7		49.6	27.9			47.5	
Queue Delay	0.0	0.0		0.0	0.0		0.0	0.0			0.0	
Total Delay	45.6	1.5		54.6	9.7		49.6	27.9			47.5	
LOS	D	A		D	A		D	C			D	
Approach Delay		4.8			10.8			40.2			47.5	
Approach LOS		A			B			D			D	
Queue Length 50th (ft)	148	32		29	110		15	4			41	
Queue Length 95th (ft)	m223	90		69	169		38	24			84	
Internal Link Dist (ft)		1085			554			123			133	
Turn Bay Length (ft)	250			400								
Base Capacity (vph)	342	3779		99	2989		230	291			260	
Starvation Cap Reductn	0	0		0	0		0	0			0	
Spillback Cap Reductn	0	0		0	0		0	0			0	
Storage Cap Reductn	0	0		0	0		0	0			0	
Reduced v/c Ratio	0.54	0.60		0.37	0.49		0.09	0.05			0.29	

Intersection Summary

Cycle Length: 120

Actuated Cycle Length: 120

Offset: 60 (50%), Referenced to phase 2:EBT and 6:WBT, Start of Green

Control Type: Actuated-Coordinated

Maximum v/c Ratio: 0.66

Intersection Signal Delay: 8.2

Intersection LOS: A

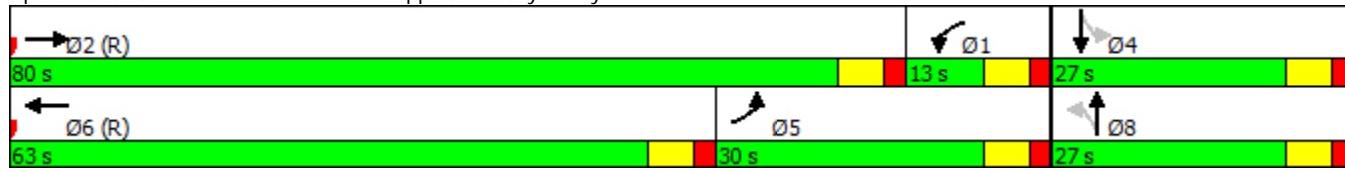
Intersection Capacity Utilization 73.5%

ICU Level of Service D

Analysis Period (min) 15

m Volume for 95th percentile queue is metered by upstream signal.

Splits and Phases: 5: Marine Blvd/Sheppard St & Lynnway



Lynnway-Route 1A-Carroll Parkway Study  
15: Blossom St & Lynnway

Alternative 4: 2040 PM

5:00 pm

Lane Group	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations		↑↑↓		↑	↑↑↓		↑	↓		↑	↓	
Traffic Volume (vph)	0	2150	25	20	1275	155	20	10	25	50	10	60
Future Volume (vph)	0	2150	25	20	1275	155	20	10	25	50	10	60
Satd. Flow (prot)	0	4906	0	1711	4837	0	1711	1608	0	1711	1570	0
Flt Permitted				0.950			0.693			0.732		
Satd. Flow (perm)	0	4906	0	1711	4837	0	1248	1608	0	1318	1570	0
Satd. Flow (RTOR)		3			54			27			64	
Lane Group Flow (vph)	0	2311	0	21	1520	0	21	38	0	53	75	0
Turn Type	NA		Prot	NA		Perm	NA		Perm	NA		
Protected Phases	2		1	6			8				4	
Permitted Phases							8				4	
Total Split (s)	80.0		17.0	97.0		23.0	23.0		23.0	23.0		
Total Lost Time (s)	5.0		5.0	5.0		5.0	5.0		4.0	4.0		
Act Effct Green (s)	85.2		8.5	92.0		18.0	18.0		19.0	19.0		
Actuated g/C Ratio	0.71		0.07	0.77		0.15	0.15		0.16	0.16		
v/c Ratio	0.66		0.17	0.41		0.11	0.14		0.25	0.25		
Control Delay	7.6		43.7	1.2		46.0	22.6		48.0	16.0		
Queue Delay	0.0		0.0	0.0		0.0	0.0		0.0	0.0		
Total Delay	7.6		43.7	1.3		46.0	22.6		48.0	16.0		
LOS	A		D	A		D	C		D	B		
Approach Delay	7.6			1.8			30.9			29.2		
Approach LOS	A			A			C			C		
Queue Length 50th (ft)	43		17	31		14	7		36	7		
Queue Length 95th (ft)	243		m39	4		39	40		77	51		
Internal Link Dist (ft)	554			494			259			262		
Turn Bay Length (ft)			150									
Base Capacity (vph)	3483		171	3720		187	264		208	302		
Starvation Cap Reductn	0		0	331		0	0		0	0		
Spillback Cap Reductn	0		0	0		0	0		0	0		
Storage Cap Reductn	0		0	0		0	0		0	0		
Reduced v/c Ratio	0.66		0.12	0.45		0.11	0.14		0.25	0.25		

Intersection Summary

Cycle Length: 120

Actuated Cycle Length: 120

Offset: 48 (40%), Referenced to phase 2:EBT and 6:WBT, Start of Green

Control Type: Actuated-Coordinated

Maximum v/c Ratio: 0.66

Intersection Signal Delay: 6.4

Intersection LOS: A

Intersection Capacity Utilization 59.9%

ICU Level of Service B

Analysis Period (min) 15

m Volume for 95th percentile queue is metered by upstream signal.

Splits and Phases: 15: Blossom St & Lynnway



Lynnway-Route 1A-Carroll Parkway Study  
6: Kingman St & Lynnway

Alternative 4: 2040 PM

5:00 pm



Lane Group	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations	↑	↑↑↑		↑	↑↑↑		↑	↑				
Traffic Volume (vph)	65	2185	35	75	1290	40	100	5	115	0	0	0
Future Volume (vph)	65	2185	35	75	1290	40	100	5	115	0	0	0
Satd. Flow (prot)	1711	4906	0	1711	4891	0	1711	1541	0	0	0	0
Flt Permitted	0.950			0.950			0.950					
Satd. Flow (perm)	1711	4906	0	1711	4891	0	1711	1541	0	0	0	0
Satd. Flow (RTOR)						6			122			
Lane Group Flow (vph)	69	2359	0	80	1414	0	106	127	0	0	0	0
Turn Type	Prot	NA		Prot	NA		Split	NA				
Protected Phases	5	2		1	6		8	8				
Permitted Phases												
Total Split (s)	20.0	70.0		20.0	70.0		30.0	30.0				
Total Lost Time (s)	4.0	4.0		4.0	4.0		4.0	4.0				
Act Effct Green (s)	11.0	82.5		11.0	82.5		16.7	16.7				
Actuated g/C Ratio	0.09	0.69		0.09	0.69		0.14	0.14				
v/c Ratio	0.44	0.70		0.51	0.42		0.45	0.40				
Control Delay	46.8	8.8		62.4	4.1		51.2	11.5				
Queue Delay	0.0	0.0		0.0	0.0		0.0	0.0				
Total Delay	46.8	8.9		62.4	4.1		51.2	11.5				
LOS	D	A		E	A		D	B				
Approach Delay		9.9			7.2			29.5				
Approach LOS		A			A			C				
Queue Length 50th (ft)	49	243		64	50		79	4				
Queue Length 95th (ft)	m85	345		116	94		122	54				
Internal Link Dist (ft)		494			544			258				85
Turn Bay Length (ft)	200			300								
Base Capacity (vph)	228	3375		228	3366		370	429				
Starvation Cap Reductn	0	39		0	0		0	0				
Spillback Cap Reductn	0	0		0	0		0	0				
Storage Cap Reductn	0	0		0	0		0	0				
Reduced v/c Ratio	0.30	0.71		0.35	0.42		0.29	0.30				

Intersection Summary

Cycle Length: 120

Actuated Cycle Length: 120

Offset: 61 (51%), Referenced to phase 2:EBT and 6:WBT, Start of Green

Control Type: Actuated-Coordinated

Maximum v/c Ratio: 0.70

Intersection Signal Delay: 10.1

Intersection LOS: B

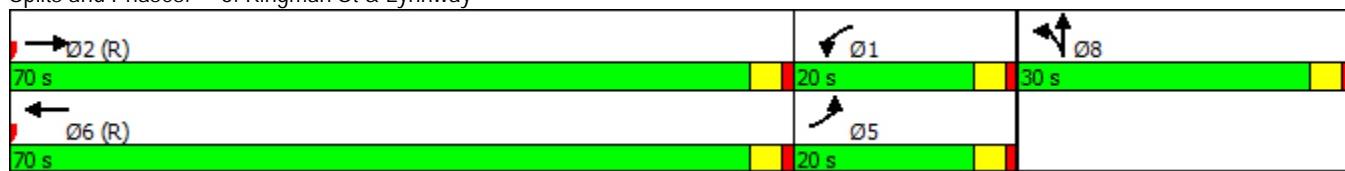
Intersection Capacity Utilization 67.2%

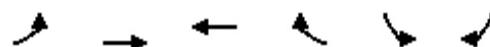
ICU Level of Service C

Analysis Period (min) 15

m Volume for 95th percentile queue is metered by upstream signal.

Splits and Phases: 6: Kingman St & Lynnway





Lane Group	EBL	EBT	WBT	WBR	SBL	SBR
Lane Configurations	↑↑	↑↑↑	↑↑↑	↑	↑↑	
Traffic Volume (vph)	815	1450	805	165	215	15
Future Volume (vph)	815	1450	805	165	215	15
Satd. Flow (prot)	3319	4916	4916	1531	3303	0
Flt Permitted	0.950				0.955	
Satd. Flow (perm)	3319	4916	4916	1531	3303	0
Satd. Flow (RTOR)				175	6	
Lane Group Flow (vph)	866	1541	855	175	244	0
Turn Type	Prot	NA	NA	Perm	Prot	
Protected Phases	5	2	6		7	
Permitted Phases				6		
Total Split (s)	50.0	80.0	30.0	30.0	40.0	
Total Lost Time (s)	5.0	4.0	4.0	4.0	4.0	
Act Effct Green (s)	45.0	97.5	47.5	47.5	14.5	
Actuated g/C Ratio	0.38	0.81	0.40	0.40	0.12	
v/c Ratio	0.70	0.39	0.44	0.25	0.61	
Control Delay	19.4	1.6	27.9	4.6	24.1	
Queue Delay	0.0	0.0	0.0	0.0	0.0	
Total Delay	19.4	1.6	27.9	4.6	24.1	
LOS	B	A	C	A	C	
Approach Delay		8.0	23.9		24.1	
Approach LOS		A	C		C	
Queue Length 50th (ft)	239	35	173	0	37	
Queue Length 95th (ft)	251	40	225	47	52	
Internal Link Dist (ft)		429	1170		315	
Turn Bay Length (ft)			600			
Base Capacity (vph)	1244	3994	1946	712	995	
Starvation Cap Reductn	0	0	0	0	0	
Spillback Cap Reductn	0	0	0	0	0	
Storage Cap Reductn	0	0	0	0	0	
Reduced v/c Ratio	0.70	0.39	0.44	0.25	0.25	

#### Intersection Summary

Cycle Length: 120

Actuated Cycle Length: 120

Offset: 68 (57%), Referenced to phase 2:EBT and 6:WBT, Start of Green

Control Type: Actuated-Coordinated

Maximum v/c Ratio: 0.70

Intersection Signal Delay: 13.5

Intersection LOS: B

Intersection Capacity Utilization 57.1%

ICU Level of Service B

Analysis Period (min) 15

Splits and Phases: 7: Lynnway/Carroll Parkway & Market St



Lynnway-Route 1A-Carroll Parkway Study  
9: Market St & Broad St

Alternative 4: 2040 PM  
5:00 pm

	↑	→	↓	↖	←	↗	↙	↑	↗	↖	↓	↙
Lane Group	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations					↑↑	↑↑		↑↑	↑↑		↑↑	
Traffic Volume (vph)	0	0	0	335	0	205	15	395	570	290	175	160
Future Volume (vph)	0	0	0	335	0	205	15	395	570	290	175	160
Satd. Flow (prot)	0	0	0	0	3250	1531	0	3414	1531	0	3216	0
Flt Permitted					0.950				0.921			0.635
Satd. Flow (perm)	0	0	0	0	3250	1531	0	3151	1531	0	2090	0
Satd. Flow (RTOR)						218			606			56
Lane Group Flow (vph)	0	0	0	0	356	218	0	436	606	0	664	0
Turn Type					Split	NA	Perm	Perm	NA	pt+ov	Perm	NA
Protected Phases					8	8			2	2	8	6
Permitted Phases							8	2				6
Total Split (s)				29.0	29.0	29.0	64.0	64.0		64.0	64.0	
Total Lost Time (s)					5.0	5.0		5.0				5.0
Act Effct Green (s)					21.2	21.2		72.6	100.8			72.6
Actuated g/C Ratio					0.18	0.18		0.60	0.84			0.60
v/c Ratio					1.18dl	0.48		0.23	0.44			0.52
Control Delay					51.1	17.9		8.5	4.8			17.4
Queue Delay					0.0	0.0		0.0	0.3			0.0
Total Delay					51.1	17.9		8.5	5.1			17.4
LOS					D	B		A	A			B
Approach Delay					38.5			6.5				17.4
Approach LOS					D			A				B
Queue Length 50th (ft)					136	35		33	112			173
Queue Length 95th (ft)					204	143		70	211			243
Internal Link Dist (ft)	27					705			315			249
Turn Bay Length (ft)						150						
Base Capacity (vph)					650	480		1906	1383			1286
Starvation Cap Reductn					0	0		0	265			0
Spillback Cap Reductn					0	0		0	0			0
Storage Cap Reductn					0	0		0	0			0
Reduced v/c Ratio					0.55	0.45		0.23	0.54			0.52

Intersection Summary

Cycle Length: 120

Actuated Cycle Length: 120

Offset: 77 (64%), Referenced to phase 2:NBTL and 6:SBTL, Start of Green

Control Type: Actuated-Coordinated

Maximum v/c Ratio: 0.62

Intersection Signal Delay: 17.7

Intersection LOS: B

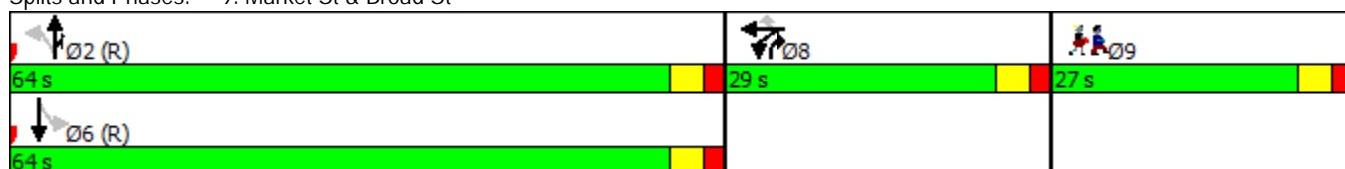
Intersection Capacity Utilization 63.1%

ICU Level of Service B

Analysis Period (min) 15

dl Defacto Left Lane. Recode with 1 though lane as a left lane.

Splits and Phases: 9: Market St & Broad St



Lynnway-Route 1A-Carroll Parkway Study  
10: Washington St & Broad St & Spring St

Alternative 4: 2040 PM

5:00 pm

Lane Group	EBL	EBT	EBR	WBL	WBT	WBR2	NBL2	NBL	NBT	NBR	SBL	SBT
Lane Configurations		↑	↑		↑↑			↑	↑			↓
Traffic Volume (vph)	15	415	405	20	375	5	105	0	75	25	5	20
Future Volume (vph)	15	415	405	20	375	5	105	0	75	25	5	20
Satd. Flow (prot)	0	1797	1531	0	3408	0	0	1711	1732	0	0	1617
Flt Permitted		0.978			0.918			0.625				0.984
Satd. Flow (perm)	0	1761	1531	0	3134	0	0	1125	1732	0	0	1595
Satd. Flow (RTOR)			430		127				13			
Lane Group Flow (vph)	0	457	430	0	424	0	0	112	107	0	0	100
Turn Type	Perm	NA	Perm	Perm	NA		Perm	Perm	NA		Perm	NA
Protected Phases		2			6				8			4
Permitted Phases	2		2	6			8	8				4
Total Split (s)	44.0	44.0	44.0	44.0	44.0		30.0	30.0	30.0	30.0	30.0	30.0
Total Lost Time (s)		7.0	7.0		7.0			6.0	6.0			6.0
Act Effct Green (s)	66.2	66.2		66.2			16.4	16.4				16.4
Actuated g/C Ratio	0.55	0.55		0.55			0.14	0.14				0.14
v/c Ratio	0.47	0.41		0.24			0.73	0.43				0.46
Control Delay	20.2	5.8		12.7			75.0	45.6				53.2
Queue Delay	0.0	0.0		0.0			0.0	0.0				0.0
Total Delay	20.2	5.8		12.7			75.0	45.6				53.2
LOS	C	A		B			E	D				D
Approach Delay	13.2			12.7				60.7				53.2
Approach LOS	B			B			E					D
Queue Length 50th (ft)	219	11		52			84	67				72
Queue Length 95th (ft)	#514	233		140			140	117				120
Internal Link Dist (ft)	705			409				1177				214
Turn Bay Length (ft)							150					
Base Capacity (vph)	971	1037		1786			225	356				319
Starvation Cap Reductn	0	0		0			0	0				0
Spillback Cap Reductn	0	0		0			0	0				0
Storage Cap Reductn	0	0		0			0	0				0
Reduced v/c Ratio	0.47	0.41		0.24			0.50	0.30				0.31

Intersection Summary

Cycle Length: 120

Actuated Cycle Length: 120

Offset: 40 (33%), Referenced to phase 2:EBTL and 6:WBTL, Start of Green

Control Type: Actuated-Coordinated

Maximum v/c Ratio: 0.73

Intersection Signal Delay: 24.3

Intersection LOS: C

Intersection Capacity Utilization 73.5%

ICU Level of Service D

Analysis Period (min) 15

# 95th percentile volume exceeds capacity, queue may be longer.

Queue shown is maximum after two cycles.

Splits and Phases: 10: Washington St & Broad St & Spring St





Lane Group	SBR	SEL2	SEL	SER	SER2	Ø9
Lane Configurations						
Traffic Volume (vph)	70	15	105	100	30	
Future Volume (vph)	70	15	105	100	30	
Satd. Flow (prot)	0	0	1711	1531	0	
Flt Permitted			0.950			
Satd. Flow (perm)	0	0	1711	1531	0	
Satd. Flow (RTOR)			136			
Lane Group Flow (vph)	0	0	128	138	0	
Turn Type		Prot	Prot	Prot		
Protected Phases		10	10	10		9
Permitted Phases						
Total Split (s)	23.0	23.0	23.0		23.0	
Total Lost Time (s)		6.0	6.0			
Act Effct Green (s)		13.8	13.8			
Actuated g/C Ratio		0.12	0.12			
v/c Ratio		0.65	0.47			
Control Delay		65.9	13.4			
Queue Delay		0.0	0.0			
Total Delay		65.9	13.4			
LOS	E	B				
Approach Delay		38.6				
Approach LOS		D				
Queue Length 50th (ft)		96	1			
Queue Length 95th (ft)		158	60			
Internal Link Dist (ft)		258				
Turn Bay Length (ft)		150				
Base Capacity (vph)		243	334			
Starvation Cap Reductn		0	0			
Spillback Cap Reductn		0	0			
Storage Cap Reductn		0	0			
Reduced v/c Ratio		0.53	0.41			
Intersection Summary						

Intersection							
Approach	WB		SB		NE		
Entry Lanes	2		2		2		
Conflicting Circle Lanes	2		2		2		
Adj Approach Flow, veh/h	851		1753		414		
Demand Flow Rate, veh/h	868		1788		422		
Vehicles Circulating, veh/h	401		217		1452		
Vehicles Exiting, veh/h	1473		1052		217		
Follow-Up Headway, s	3.186		3.186		3.186		
Ped Vol Crossing Leg, #/h	0		0		0		
Ped Cap Adj	1.000		1.000		1.000		
Approach Delay, s/veh	11.5		16.6		22.7		
Approach LOS	B		C		C		
Lane	Left	Right	Left	Right	Bypass	Left	Right
Designated Moves	LTR	R	L	LTR	R	L	LTR
Assumed Moves	LTR	R	L	LTR	R	L	LTR
RT Channelized	Yield						
Lane Util	0.470	0.530	0.530	0.470	0.531		
Critical Headway, s	4.293	4.113	4.293	4.113	4.293		
Entry Flow, veh/h	408	460	770	682	336	224	198
Cap Entry Lane, veh/h	836	853	960	971	971	380	409
Entry HV Adj Factor	0.980	0.980	0.980	0.981	0.980	0.980	0.983
Flow Entry, veh/h	400	451	755	669	329	219	195
Cap Entry, veh/h	820	837	941	953	952	373	402
V/C Ratio	0.488	0.539	0.802	0.703	0.346	0.589	0.484
Control Delay, s/veh	10.9	11.9	21.3	15.7	7.5	25.6	19.5
LOS	B	B	C	C	A	D	C
95th %tile Queue, veh	3	3	9	6	2	4	3





Lane Group	WBL	WBR	NBT	NBR	SBL	SBT
Lane Configurations	↑ ↘	↑ ↘	↑↑↑ ↘		↑ ↘	↑↑↑
Traffic Volume (vph)	95	180	1530	120	260	1450
Future Volume (vph)	95	180	1530	120	260	1450
Satd. Flow (prot)	1678	1501	4768	0	1678	4821
Flt Permitted	0.950				0.950	
Satd. Flow (perm)	1678	1501	4768	0	1678	4821
Satd. Flow (RTOR)			191	15		
Lane Group Flow (vph)	101	191	1754	0	276	1541
Turn Type	Prot	Perm	NA		Prot	NA
Protected Phases	8		2		1	6
Permitted Phases			8			
Total Split (s)	35.0	35.0	66.0		19.0	85.0
Total Lost Time (s)	5.0	5.0	5.0		5.0	4.0
Act Efect Green (s)	16.5	16.5	61.0		27.5	94.5
Actuated g/C Ratio	0.14	0.14	0.51		0.23	0.79
v/c Ratio	0.44	0.51	0.72		0.72	0.41
Control Delay	51.0	10.7	24.8		69.4	1.5
Queue Delay	0.0	0.0	0.0		0.0	0.0
Total Delay	51.0	10.7	24.8		69.4	1.5
LOS	D	B	C		E	A
Approach Delay	24.6		24.8			11.8
Approach LOS	C		C			B
Queue Length 50th (ft)	76	0	371		225	25
Queue Length 95th (ft)	118	61	428	#428		39
Internal Link Dist (ft)	376		617			1043
Turn Bay Length (ft)					400	
Base Capacity (vph)	419	518	2431		383	3794
Starvation Cap Reductn	0	0	0		0	0
Spillback Cap Reductn	0	0	0		0	0
Storage Cap Reductn	0	0	0		0	0
Reduced v/c Ratio	0.24	0.37	0.72		0.72	0.41

#### Intersection Summary

Cycle Length: 120

Actuated Cycle Length: 120

Offset: 0 (0%), Referenced to phase 2:NBT and 6:SBT, Start of Green, Master Intersection

Control Type: Actuated-Coordinated

Maximum v/c Ratio: 0.72

Intersection Signal Delay: 18.7

Intersection LOS: B

Intersection Capacity Utilization 65.9%

ICU Level of Service C

Analysis Period (min) 15

# 95th percentile volume exceeds capacity, queue may be longer.

Queue shown is maximum after two cycles.

Splits and Phases: 2: Lynnway & Hanson St



Lane Group	NBL	NBT	NBR	SBL	SBT	SBR	NEL	NET	NER	SWL	SWT	SWR
Lane Configurations	↑	↑			↑	↑	↑	↑↑↑		↑	↑↑↑	
Traffic Volume (vph)	35	5	40	15	5	5	85	1555	75	200	1630	15
Future Volume (vph)	35	5	40	15	5	5	85	1555	75	200	1630	15
Satd. Flow (prot)	1678	1529	0	0	1701	1501	1678	4788	0	1678	4816	0
Flt Permitted	0.744					0.798		0.950			0.950	
Satd. Flow (perm)	1314	1529	0	0	1409	1501	1678	4788	0	1678	4816	0
Satd. Flow (RTOR)			43			109		8			2	
Lane Group Flow (vph)	37	48	0	0	21	5	90	1732	0	213	1748	0
Turn Type	Perm	NA		Perm	NA	Perm	Prot	NA	Prot	NA		
Protected Phases			8			4		5		1	6	
Permitted Phases	8				4		4					
Total Split (s)	32.0	32.0		32.0	32.0	32.0	18.0	58.0		30.0	70.0	
Total Lost Time (s)	6.0	6.0			6.0	6.0	5.0	5.0		5.0	5.0	
Act Efect Green (s)	18.1	18.1			18.1	18.1	13.0	68.3		19.9	75.2	
Actuated g/C Ratio	0.15	0.15			0.15	0.15	0.11	0.57		0.17	0.63	
v/c Ratio	0.19	0.18			0.10	0.02	0.50	0.64		0.77	0.58	
Control Delay	42.3	14.7			39.9	0.0	37.9	7.1		50.1	30.0	
Queue Delay	0.0	0.0			0.0	0.0	0.0	0.0		0.0	0.0	
Total Delay	42.3	14.7			39.9	0.0	37.9	7.1		50.1	30.0	
LOS	D	B			D	A	D	A		D	C	
Approach Delay		26.7			32.2			8.6			32.2	
Approach LOS		C			C			A			C	
Queue Length 50th (ft)	23	3			13	0	66	56		166	483	
Queue Length 95th (ft)	54	36			36	0	m97	159		m204	536	
Internal Link Dist (ft)		148			94			1043			1847	
Turn Bay Length (ft)							300			300		
Base Capacity (vph)	284	364			305	410	181	2727		349	3017	
Starvation Cap Reductn	0	0			0	0	0	0		0	0	
Spillback Cap Reductn	0	0			0	0	0	0		0	0	
Storage Cap Reductn	0	0			0	0	0	0		0	0	
Reduced v/c Ratio	0.13	0.13			0.07	0.01	0.50	0.64		0.61	0.58	

#### Intersection Summary

Cycle Length: 120

Actuated Cycle Length: 120

Offset: 23 (19%), Referenced to phase 2:NET and 6:SWT, Start of Green

Control Type: Actuated-Coordinated

Maximum v/c Ratio: 0.77

Intersection Signal Delay: 21.1

Intersection LOS: C

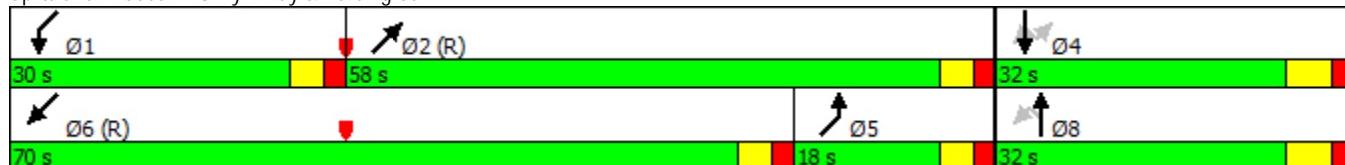
Intersection Capacity Utilization 65.6%

ICU Level of Service C

Analysis Period (min) 15

m Volume for 95th percentile queue is metered by upstream signal.

Splits and Phases: 3: Lynnway & Harding St





Lane Group	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations	↑	↑↑↑			↑↑↑	↑				↑	↑	↑
Traffic Volume (vph)	550	1380	10	0	1190	260	0	0	0	330	80	460
Future Volume (vph)	550	1380	10	0	1190	260	0	0	0	330	80	460
Satd. Flow (prot)	1678	4816	0	0	4821	1501	0	0	0	1678	1766	1501
Flt Permitted	0.950									0.950		
Satd. Flow (perm)	1678	4816	0	0	4821	1501	0	0	0	1678	1766	1501
Satd. Flow (RTOR)			2			276						9
Lane Group Flow (vph)	584	1477	0	0	1264	276	0	0	0	351	85	489
Turn Type	Prot	NA			NA	Perm				Perm	NA	pt+ov
Protected Phases	5	2			6					4		4 5
Permitted Phases					6					4		
Total Split (s)	49.0	88.0			39.0	39.0				32.0	32.0	
Total Lost Time (s)	4.0	4.0			4.0	4.0				4.0	4.0	
Act Efct Green (s)	45.0	84.8			35.8	35.8				27.2	27.2	76.2
Actuated g/C Ratio	0.38	0.71			0.30	0.30				0.23	0.23	0.64
v/c Ratio	0.93	0.43			0.88	0.43				0.92	0.21	0.51
Control Delay	38.1	1.7			23.3	5.5				76.0	38.9	13.7
Queue Delay	0.0	0.0			0.0	0.0				0.0	0.0	0.0
Total Delay	38.1	1.7			23.3	5.5				76.0	38.9	13.7
LOS	D	A			C	A				E	D	B
Approach Delay		12.0			20.1						39.7	
Approach LOS		B			C						D	
Queue Length 50th (ft)	437	24			181	21				265	53	182
Queue Length 95th (ft)	#668	31			#336	90				#439	99	266
Internal Link Dist (ft)		1847			1063			493			489	
Turn Bay Length (ft)	600				300					200		200
Base Capacity (vph)	629	3402			1436	641				391	412	966
Starvation Cap Reductn	0	0			0	0				0	0	0
Spillback Cap Reductn	0	0			0	0				0	0	0
Storage Cap Reductn	0	0			0	0				0	0	0
Reduced v/c Ratio	0.93	0.43			0.88	0.43				0.90	0.21	0.51

#### Intersection Summary

Cycle Length: 120

Actuated Cycle Length: 120

Offset: 31 (26%), Referenced to phase 2:EBT and 6:WBT, Start of Green

Control Type: Actuated-Coordinated

Maximum v/c Ratio: 0.93

Intersection Signal Delay: 20.4

Intersection LOS: C

Intersection Capacity Utilization 83.2%

ICU Level of Service E

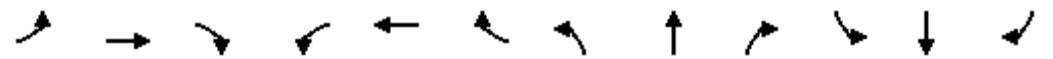
Analysis Period (min) 15

# 95th percentile volume exceeds capacity, queue may be longer.

Queue shown is maximum after two cycles.

Splits and Phases: 4: Commercial St & Lynnway





Lane Group	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations	↑	↑↑↑		↑	↑↑↑		↑	↑			↔	
Traffic Volume (vph)	115	1560	5	55	1400	50	5	5	5	35	5	30
Future Volume (vph)	115	1560	5	55	1400	50	5	5	5	35	5	30
Satd. Flow (prot)	1678	4821	0	1678	4797	0	1678	1634	0	0	1624	0
Flt Permitted	0.950			0.950			0.735				0.840	
Satd. Flow (perm)	1678	4821	0	1678	4797	0	1298	1634	0	0	1397	0
Satd. Flow (RTOR)		1			6			5			30	
Lane Group Flow (vph)	122	1663	0	58	1541	0	5	10	0	0	74	0
Turn Type	Prot	NA		Prot	NA		Perm	NA		Perm	NA	
Protected Phases	5	2		1	6				8			4
Permitted Phases							8				4	
Total Split (s)	23.0	69.0		17.0	63.0		34.0	34.0		34.0	34.0	
Total Lost Time (s)	5.0	5.0		5.0	5.0		6.0	6.0			6.0	
Act Efect Green (s)	14.6	82.1		9.5	73.6		18.4	18.4			18.4	
Actuated g/C Ratio	0.12	0.68		0.08	0.61		0.15	0.15			0.15	
v/c Ratio	0.60	0.50		0.44	0.52		0.03	0.04			0.31	
Control Delay	64.9	11.6		42.0	11.8		37.4	27.9			29.0	
Queue Delay	0.0	0.0		0.0	0.0		0.0	0.0			0.0	
Total Delay	64.9	11.6		42.0	11.8		37.4	27.9			29.0	
LOS	E	B		D	B		D	C			C	
Approach Delay		15.2			12.9			31.1			29.0	
Approach LOS		B			B			C			C	
Queue Length 50th (ft)	95	371		44	112		3	3			28	
Queue Length 95th (ft)	m149	438		88	195		14	18			71	
Internal Link Dist (ft)		1063			584			95			161	
Turn Bay Length (ft)	250			400								
Base Capacity (vph)	251	3298		167	2944		302	385			348	
Starvation Cap Reductn	0	0		0	0		0	0			0	
Spillback Cap Reductn	0	0		0	0		0	0			0	
Storage Cap Reductn	0	0		0	0		0	0			0	
Reduced v/c Ratio	0.49	0.50		0.35	0.52		0.02	0.03			0.21	

#### Intersection Summary

Cycle Length: 120

Actuated Cycle Length: 120

Offset: 105 (88%), Referenced to phase 2:EBT and 6:WBT, Start of Green

Control Type: Actuated-Coordinated

Maximum v/c Ratio: 0.60

Intersection Signal Delay: 14.5

Intersection LOS: B

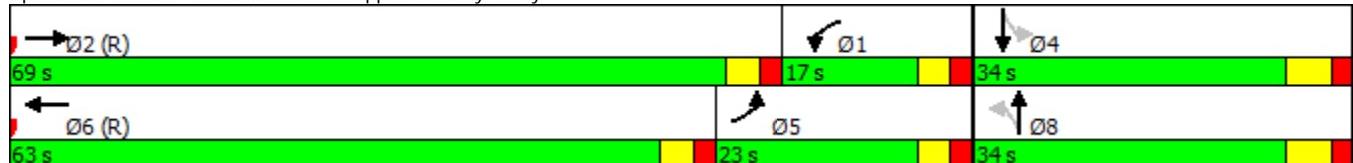
Intersection Capacity Utilization 60.8%

ICU Level of Service B

Analysis Period (min) 15

m Volume for 95th percentile queue is metered by upstream signal.

Splits and Phases: 5: Marine Blvd/Sheppard St & Lynnway





Lane Group	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations		↑↑↑			↑↑↑					↑↑		
Traffic Volume (vph)	0	1555	45	30	1430	120	20	10	20	20	10	20
Future Volume (vph)	0	1555	45	30	1430	120	20	10	20	20	10	20
Satd. Flow (prot)	0	4802	0	1678	4763	0	1678	1593	0	1678	1593	0
Flt Permitted					0.950			0.736			0.736	
Satd. Flow (perm)	0	4802	0	1678	4763	0	1300	1593	0	1300	1593	0
Satd. Flow (RTOR)		6			27			21			21	
Lane Group Flow (vph)	0	1700	0	32	1647	0	21	32	0	21	32	0
Turn Type		NA		Prot	NA		Perm	NA		Perm	NA	
Protected Phases		2		1	6			4			4	
Permitted Phases							4			4		
Total Split (s)	76.0		12.0	76.0		32.0	32.0		32.0	32.0		32.0
Total Lost Time (s)		4.0		4.0		4.0	4.0		4.0	4.0		4.0
Act Efct Green (s)	89.6		7.2	96.8		17.9	17.9		17.9	17.9		17.9
Actuated g/C Ratio	0.75		0.06	0.81		0.15	0.15		0.15	0.15		0.15
v/c Ratio	0.47		0.32	0.43		0.11	0.12		0.11	0.12		0.12
Control Delay	1.1		53.0	0.6		40.2	21.0		40.2	21.0		21.0
Queue Delay	0.0		0.0	0.0		0.0	0.0		0.0	0.0		0.0
Total Delay	1.1		53.0	0.6		40.2	21.0		40.2	21.0		21.0
LOS	A		D	A		D	C		D	C		
Approach Delay	1.1			1.6			28.6			28.6		
Approach LOS	A			A			C			C		
Queue Length 50th (ft)	10		26	10		13	7		13	7		
Queue Length 95th (ft)	20		m54	12		36	34		36	34		
Internal Link Dist (ft)	584			497			259			262		
Turn Bay Length (ft)												
Base Capacity (vph)	3585		111	3846		303	387		303	387		
Starvation Cap Reductn	0		0	227		0	0		0	0		
Spillback Cap Reductn	0		0	0		0	0		0	0		
Storage Cap Reductn	0		0	0		0	0		0	0		
Reduced v/c Ratio	0.47		0.29	0.46		0.07	0.08		0.07	0.08		

#### Intersection Summary

Cycle Length: 120

Actuated Cycle Length: 120

Offset: 107 (89%), Referenced to phase 2:EBT and 6:WBT, Start of Green

Control Type: Actuated-Coordinated

Maximum v/c Ratio: 0.47

Intersection Signal Delay: 2.2

Intersection LOS: A

Intersection Capacity Utilization 46.1%

ICU Level of Service A

Analysis Period (min) 15

m Volume for 95th percentile queue is metered by upstream signal.

Splits and Phases: 15: Blossom St & Lynnway





Lane Group	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations	↑	↑↑↑		↑	↑↑↑		↑	↑				
Traffic Volume (vph)	65	1530	15	15	1500	40	30	0	30	0	0	0
Future Volume (vph)	65	1530	15	15	1500	40	30	0	30	0	0	0
Satd. Flow (prot)	1678	4816	0	1678	4802	0	1678	1501	0	0	0	0
Flt Permitted	0.950				0.950			0.950				
Satd. Flow (perm)	1678	4816	0	1678	4802	0	1678	1501	0	0	0	0
Satd. Flow (RTOR)		2			5			198				
Lane Group Flow (vph)	69	1642	0	16	1637	0	32	32	0	0	0	0
Turn Type	Prot	NA		Prot	NA		Split	NA				
Protected Phases	5	2		1	6		8	8				
Permitted Phases												
Total Split (s)	17.0	68.0		21.0	72.0		31.0	31.0				
Total Lost Time (s)	4.0	4.0		4.0	4.0		4.0	4.0				
Act Efect Green (s)	10.2	88.5		10.8	84.7		18.0	18.0				
Actuated g/C Ratio	0.08	0.74		0.09	0.71		0.15	0.15				
v/c Ratio	0.49	0.46		0.11	0.48		0.13	0.08				
Control Delay	48.3	3.5		47.9	4.5		40.6	0.4				
Queue Delay	0.0	0.0		0.0	0.0		0.0	0.0				
Total Delay	48.3	3.5		47.9	4.5		40.6	0.4				
LOS	D	A		D	A		D	A				
Approach Delay		5.3			4.9			20.5				
Approach LOS		A			A			C				
Queue Length 50th (ft)	53	11		13	81		20	0				
Queue Length 95th (ft)	102	84		m28	97		48	0				
Internal Link Dist (ft)		497			380			258				85
Turn Bay Length (ft)				300								
Base Capacity (vph)	181	3552		237	3391		377	491				
Starvation Cap Reductn	0	95		0	0		0	0				
Spillback Cap Reductn	0	0		0	0		0	0				
Storage Cap Reductn	0	0		0	0		0	0				
Reduced v/c Ratio	0.38	0.47		0.07	0.48		0.08	0.07				

#### Intersection Summary

Cycle Length: 120

Actuated Cycle Length: 120

Offset: 107 (89%), Referenced to phase 2:EBT and 6:WBT, Start of Green

Control Type: Actuated-Coordinated

Maximum v/c Ratio: 0.49

Intersection Signal Delay: 5.4

Intersection LOS: A

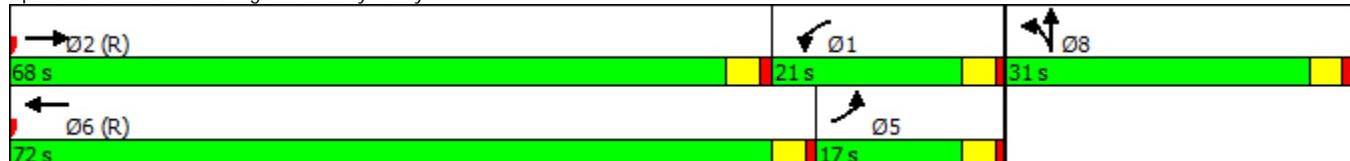
Intersection Capacity Utilization 49.7%

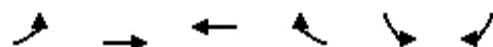
ICU Level of Service A

Analysis Period (min) 15

m Volume for 95th percentile queue is metered by upstream signal.

Splits and Phases: 6: Kingman St & Lynnway





Lane Group	EBL	EBT	WBT	WBR	SBL	SBR
Lane Configurations	↑↑	↑↑↑	↑↑↑	↑	↑↑	
Traffic Volume (vph)	600	985	970	225	300	10
Future Volume (vph)	600	985	970	225	300	10
Satd. Flow (prot)	3255	4821	4821	1501	3252	0
Flt Permitted	0.950				0.954	
Satd. Flow (perm)	3255	4821	4821	1501	3252	0
Satd. Flow (RTOR)				239	3	
Lane Group Flow (vph)	638	1047	1031	239	330	0
Turn Type	Prot	NA	NA	Perm	Prot	
Protected Phases	5	2	6		7	
Permitted Phases				6		
Total Split (s)	50.0	80.0	30.0	30.0	40.0	
Total Lost Time (s)	5.0	4.0	4.0	4.0	4.0	
Act Efct Green (s)	45.0	94.6	44.6	44.6	17.4	
Actuated g/C Ratio	0.38	0.79	0.37	0.37	0.14	
v/c Ratio	0.52	0.28	0.58	0.34	0.70	
Control Delay	16.2	2.4	32.3	4.9	45.7	
Queue Delay	0.0	0.0	0.0	0.0	0.0	
Total Delay	16.2	2.4	32.3	4.9	45.7	
LOS	B	A	C	A	D	
Approach Delay		7.6	27.1		45.7	
Approach LOS		A	C		D	
Queue Length 50th (ft)	64	54	231	0	114	
Queue Length 95th (ft)	104	34	297	56	161	
Internal Link Dist (ft)		431	1171		315	
Turn Bay Length (ft)			600			
Base Capacity (vph)	1220	3799	1790	707	977	
Starvation Cap Reductn	0	0	0	0	0	
Spillback Cap Reductn	0	0	0	0	0	
Storage Cap Reductn	0	0	0	0	0	
Reduced v/c Ratio	0.52	0.28	0.58	0.34	0.34	

#### Intersection Summary

Cycle Length: 120

Actuated Cycle Length: 120

Offset: 110 (92%), Referenced to phase 2:EBT and 6:WBT, Start of Green

Control Type: Actuated-Coordinated

Maximum v/c Ratio: 0.70

Intersection Signal Delay: 19.0

Intersection LOS: B

Intersection Capacity Utilization 56.5%

ICU Level of Service B

Analysis Period (min) 15

Splits and Phases: 7: Lynnway/Carroll Parkway & Market St





Lane Group	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations					↑↑	↑		↑↑	↑		↑↑	
Traffic Volume (vph)	0	0	0	75	410	175	15	375	380	205	230	155
Future Volume (vph)	0	0	0	75	410	175	15	375	380	205	230	155
Satd. Flow (prot)	0	0	0	0	3329	1501	0	3349	1501	0	3170	0
Flt Permitted					0.992			0.921			0.674	
Satd. Flow (perm)	0	0	0	0	3329	1501	0	3090	1501	0	2173	0
Satd. Flow (RTOR)						186			404		48	
Lane Group Flow (vph)	0	0	0	0	516	186	0	414	404	0	627	0
Turn Type					Split	NA	Perm	Perm	NA	pt+ov	Perm	NA
Protected Phases					3	3		2	2 3		6	
Permitted Phases							3	2			6	
Total Split (s)				43.0	43.0	43.0	50.0	50.0		50.0	50.0	
Total Lost Time (s)						4.0	4.0		5.0		5.0	
Act Efect Green (s)						28.2	28.2	66.6	100.8		66.6	
Actuated g/C Ratio						0.24	0.24	0.56	0.84		0.56	
v/c Ratio						0.66	0.38	0.24	0.30		0.51	
Control Delay						39.9	7.7	13.4	0.7		21.4	
Queue Delay						0.0	0.0	0.0	0.1		0.0	
Total Delay						39.9	7.7	13.4	0.8		21.4	
LOS						D	A	B	A		C	
Approach Delay						31.4			7.2		21.4	
Approach LOS						C		A			C	
Queue Length 50th (ft)						195	14	48	1		171	
Queue Length 95th (ft)						232	33	94	4		272	
Internal Link Dist (ft)	27					734			315		249	
Turn Bay Length (ft)							150					
Base Capacity (vph)					1081	613		1714	1362		1227	
Starvation Cap Reductn					0	0		0	265		0	
Spillback Cap Reductn					0	0		0	0		0	
Storage Cap Reductn					0	0		0	0		0	
Reduced v/c Ratio					0.48	0.30		0.24	0.37		0.51	

#### Intersection Summary

Cycle Length: 120

Actuated Cycle Length: 120

Offset: 13 (11%), Referenced to phase 2:NBT and 6:SBTL, Start of Green

Control Type: Actuated-Coordinated

Maximum v/c Ratio: 0.66

Intersection Signal Delay: 19.2

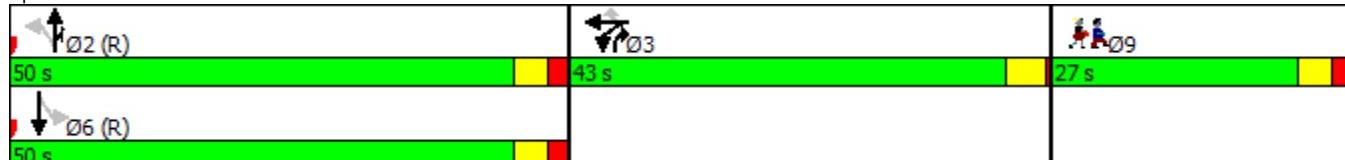
Intersection LOS: B

Intersection Capacity Utilization 54.1%

ICU Level of Service A

Analysis Period (min) 15

Splits and Phases: 9: Market St & Broad St



Lane Group	EBL	EBT	EBR	WBL	WBT	WBR2	NBL2	NBL	NBT	NBR	SBL	SBT
Lane Configurations												
Traffic Volume (vph)	55	490	30	25	580	15	20	0	50	15	10	15
Future Volume (vph)	55	490	30	25	580	15	20	0	50	15	10	15
Satd. Flow (prot)	0	1757	1501	0	3335	0	0	1678	1704	0	0	1622
Flt Permitted		0.876			0.912			0.799				0.918
Satd. Flow (perm)	0	1547	1501	0	3048	0	0	1411	1704	0	0	1503
Satd. Flow (RTOR)			136		136				11			
Lane Group Flow (vph)	0	579	32	0	659	0	0	21	69	0	0	59
Turn Type	Perm	NA	Perm	Perm	NA		Perm	Perm	NA		Perm	NA
Protected Phases		2			6				8			4
Permitted Phases	2		2	6				8	8			4
Total Split (s)	50.0	50.0	50.0	50.0	50.0			24.0	24.0	24.0		24.0
Total Lost Time (s)			7.0	7.0		7.0			5.0	5.0		6.0
Act Efect Green (s)	83.9	83.9			83.9			10.7	10.7			9.9
Actuated g/C Ratio	0.70	0.70			0.70			0.09	0.09			0.08
v/c Ratio	0.54	0.03			0.30			0.17	0.43			0.48
Control Delay	8.2	0.0			9.3			51.7	50.4			64.2
Queue Delay	0.0	0.0			0.0			0.0	0.0			0.0
Total Delay	8.2	0.0			9.3			51.7	50.4			64.2
LOS	A	A			A			D	D			E
Approach Delay	7.8				9.3				50.7			64.2
Approach LOS	A				A				D			E
Queue Length 50th (ft)	28	0			72			15	43			44
Queue Length 95th (ft)	#633	m0			202			40	88			86
Internal Link Dist (ft)	734				418				1183			220
Turn Bay Length (ft)								150				
Base Capacity (vph)	1081	1089			2171			223	279			225
Starvation Cap Reductn	0	0			0			0	0			0
Spillback Cap Reductn	0	0			0			0	0			0
Storage Cap Reductn	0	0			0			0	0			0
Reduced v/c Ratio	0.54	0.03			0.30			0.09	0.25			0.26

#### Intersection Summary

Cycle Length: 120

Actuated Cycle Length: 120

Offset: 46 (38%), Referenced to phase 2:EBTL and 6:WBT, Start of Green

Control Type: Actuated-Coordinated

Maximum v/c Ratio: 0.54

Intersection Signal Delay: 14.4

Intersection LOS: B

Intersection Capacity Utilization 83.6%

ICU Level of Service E

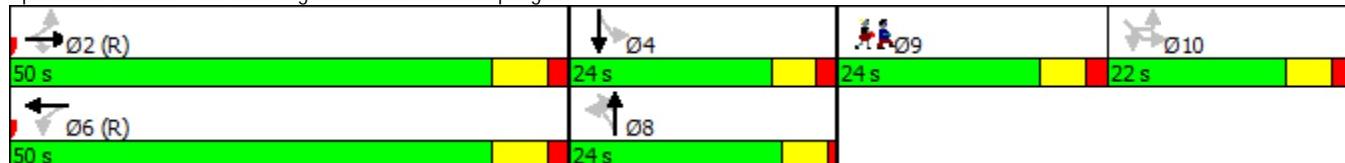
Analysis Period (min) 15

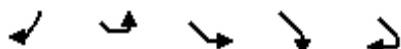
# 95th percentile volume exceeds capacity, queue may be longer.

Queue shown is maximum after two cycles.

m Volume for 95th percentile queue is metered by upstream signal.

Splits and Phases: 10: Washington St & Broad St & Spring St





Lane Group	SBR	SEL2	SEL	SER	SER2	Ø9
Lane Configurations						
Traffic Volume (vph)	30	5	35	50	30	
Future Volume (vph)	30	5	35	50	30	
Satd. Flow (prot)	0	0	1678	1501	0	
Flt Permitted				0.950		
Satd. Flow (perm)	0	0	1678	1501	0	
Satd. Flow (RTOR)				145		
Lane Group Flow (vph)	0	0	42	85	0	
Turn Type		Perm	Perm	Perm		
Protected Phases						9
Permitted Phases		10	10	10		
Total Split (s)	22.0	22.0	22.0		24.0	
Total Lost Time (s)		6.0	6.0			
Act Efct Green (s)		8.5	8.5			
Actuated g/C Ratio		0.07	0.07			
v/c Ratio		0.36	0.35			
Control Delay		60.7	4.6			
Queue Delay		0.0	0.0			
Total Delay		60.7	4.6			
LOS		E	A			
Approach Delay		23.2				
Approach LOS		C				
Queue Length 50th (ft)		32	0			
Queue Length 95th (ft)		68	4			
Internal Link Dist (ft)		258				
Turn Bay Length (ft)		150				
Base Capacity (vph)		223	325			
Starvation Cap Reductn		0	0			
Spillback Cap Reductn		0	0			
Storage Cap Reductn		0	0			
Reduced v/c Ratio		0.19	0.26			
Intersection Summary						

Intersection							
Approach	WB		SB		NE		
Entry Lanes		2		2		2	
Conflicting Circle Lanes		2		2		2	
Adj Approach Flow, veh/h	1057		1439		876		
Demand Flow Rate, veh/h	1099		1497		911		
Vehicles Circulating, veh/h	497		315		801		
Vehicles Exiting, veh/h	1215		1281		315		
Follow-Up Headway, s	3.186		3.186		3.186		
Ped Vol Crossing Leg, #/h	0		0		0		
Ped Cap Adj	1.000		1.000		1.000		
Approach Delay, s/veh	18.6		14.6		24.9		
Approach LOS	C		B		C		
Lane	Left	Right	Left	Right	Bypass	Left	Right
Designated Moves	LTR	R	L	LTR	R	L	TR
Assumed Moves	LTR	R	L	LTR	R	L	TR
RT Channelized					Yield		
Lane Util	0.470	0.530	0.531	0.469		0.546	0.454
Critical Headway, s	4.293	4.113	4.293	4.113		4.293	4.113
Entry Flow, veh/h	517	582	425	376	696	497	414
Cap Entry Lane, veh/h	778	798	892	906	906	620	645
Entry HV Adj Factor	0.961	0.963	0.960	0.962	0.962	0.962	0.961
Flow Entry, veh/h	497	560	408	362	669	478	398
Cap Entry, veh/h	748	768	857	872	871	596	620
V/C Ratio	0.664	0.729	0.476	0.415	0.768	0.802	0.642
Control Delay, s/veh	17.1	19.9	10.3	9.1	20.2	30.0	18.8
LOS	C	C	B	A	C	D	C
95th %tile Queue, veh	5	6	3	2	8	8	5

**TABLE 1**  
**Alternative 4: Traffic Queue Lengths in Feet**

Intersection/Approach	Movement	Weekday AM 50 <sup>th</sup> Percentile	Weekday AM 95 <sup>th</sup> Percentile	Weekday PM 50 <sup>th</sup> Percentile	Weekday PM 95 <sup>th</sup> Percentile	Saturday PM 50 <sup>th</sup> Percentile	Saturday PM 95 <sup>th</sup> Percentile
Lynnway and Hanson Street	--	--	--	--	--	--	--
Lynnway	NB – Through/right	193	232	484	#793	371	428
Lynnway	SB – Left	96	m145	171	#292	225	#428
Lynnway	SB – Through/right	30	59	24	37	25	39
Hanson Street	WB – Left	13	35	60	97	76	118
Hanson Street	WB – Right	0	19	0	47	0	61
Lynnway and Harding Street	--	--	--	--	--	--	--
Lynnway	NB – Left	22	55	40	m50	66	M97
Lynnway	NB – Through/right	24	30	111	642	56	159
Lynnway	SB – Left	59	m67	144	m#197	166	M205
Lynnway	SB – Through/right	158	170	38	43	483	536
Harding Street	WB – Left	17	43	27	60	23	54
Harding Street	WB – Through/right	0	0	0	0	3	36
Harding Street	EB – Left/Through	3	14	20	49	13	36
Harding Street	EB – Right	0	0	0	0	0	0
Lynnway and Commercial Street	--	--	--	--	--	--	--
Lynnway	NB – Left	186	#360	238	m#591	347	#668
Lynnway	NB – Through/right	43	62	25	27	24	31
Lynnway	SB – Through	121	252	206	#291	180	#335
Lynnway	SB – Right	5	9	47	74	13	89
Commercial Street	EB – Left	188	#287	267	#427	265	#439
Commercial Street	EB – Through	65	117	16	41	53	99
Commercial Street	EB -- Right	381	#595	86	131	182	266
Lynnway, Shepard Street, and Marine Boulevard	--	--	--	--	--	--	--
Lynnway	NB – Left	44	m82	148	m223	95	M149
Lynnway	NB – Through/right	9	19	32	90	371	438
Lynnway	SB – Left	56	m87	29	67	44	88
Lynnway	SB – Through/right	98	275	108	141	98	179
Marine Boulevard	WB – Left	8	23	15	38	3	14
Marine Boulevard	WB – Through/right	0	0	4	24	3	18
Shepard Street	EB – Left/through/right	38	72	41	84	28	71
Lynnway and Kingman Street	--	--	--	--	--	--	--
Lynnway	NB – Left	48	#95	48	m72	53	103
Lynnway	NB – Through/right	112	150	275	340	8	83
Lynnway	SB – Left	81	141	64	116	13	M28
Lynnway	SB – Through/right	142	553	50	94	81	97
Kingman Street	WB – Left	30	64	79	122	20	48
Kingman Street	WB – Through/right	3	39	4	54	0	0

Lynnway, Carroll Parkway, and							
Market Street	--	--	--	--	--	--	--
Lynnway	NB – Left	152	202	237	249	64	104
Lynnway	NB – Through	52	99	36	41	33	55
Carroll Parkway	SB – Through	252	373	173	225	231	297
Carroll Parkway	SB – Right	0	38	0	47	0	56
Market Street	EB – Left	78	118	37	52	114	161
Carroll Parkway, Nahant Road, and Lynn Shore Drive	--	--	--	--	--	--	--
Carroll Parkway	NB – Left	25	50	110	225	37	75
Carroll Parkway	NB – Right	12	25	75	150	25	50
Nahant Road	NB – Left	25	50	50	100	100	200
Nahant Road	NB – Through	25	50	37	75	60	125
Lynn Shore Drive	SB – Through	175	350	37	75	60	125
Lynn Shore Drive	SB – Right	250	500	37	75	75	150
Market Street and Broad Street	--	--	--	--	--	--	--
Market Street	NB – Through/left	24	33	34	70	48	94
Market Street	NB – Right	0	18	112	212	0	0
Market Street	SB – Left/through/right	103	169	173	243	171	272
Broad Street	WB – Through/left	206	259	136	204	195	232
Broad Street	WB – Right	19	118	35	143	14	33
Broad Street, Washington Street, and Spring Street	--	--	--	--	--	--	--
Broad Street	WB – Left/through/right	90	238	52	140	72	202
Broad Street	EB – Through/left	28	66	219	#514	28	#632
Broad Street	EB – Right	0	0	11	233	0	0
Washington Street	NB – Left	79	136	84	140	15	40
Washington Street	NB – Through/right	59	109	67	117	43	88
Washington Street	SB – Left/through/right	52	99	96	158	32	68
Spring Street	SB -- Left/through/right	46	89	72	120	44	86

# **APPENDIX L**

## **Level of Service (LOS) Analysis Alternative 5**



Lane Group	WBL	WBR	NBT	NBR	SBL	SBT
Lane Configurations	↑ ↘	↑ ↘	↑ ↗ ↘		↑ ↘	↑ ↗
Traffic Volume (vph)	20	15	925	35	150	2210
Future Volume (vph)	20	15	925	35	150	2210
Satd. Flow (prot)	1766	1580	3514	0	1766	3532
Flt Permitted	0.950				0.233	
Satd. Flow (perm)	1766	1580	3514	0	433	3532
Satd. Flow (RTOR)			16	5		
Lane Group Flow (vph)	21	16	1010	0	158	2324
Turn Type	Prot	Perm	NA		pm+pt	NA
Protected Phases	8		2		1	6
Permitted Phases			8		6	
Total Split (s)	31.0	31.0	76.0		13.0	89.0
Total Lost Time (s)	5.0	5.0	5.0		5.0	4.0
Act Efect Green (s)	18.4	18.4	84.3		96.4	99.0
Actuated g/C Ratio	0.15	0.15	0.70		0.80	0.82
v/c Ratio	0.08	0.06	0.41		0.37	0.80
Control Delay	39.4	16.8	10.2		1.2	7.9
Queue Delay	0.0	0.0	0.0		0.0	0.1
Total Delay	39.4	16.8	10.2		1.2	7.9
LOS	D	B	B		A	A
Approach Delay	29.6		10.2			7.5
Approach LOS	C		B			A
Stops (vph)	16	6	411		2	375
Fuel Used(gal)	0	0	10		1	25
CO Emissions (g/hr)	24	11	702		90	1727
NOx Emissions (g/hr)	5	2	137		18	336
VOC Emissions (g/hr)	6	2	163		21	400
Dilemma Vehicles (#)	0	0	41		0	18
Queue Length 50th (ft)	13	0	221		1	93
Queue Length 95th (ft)	35	19	272	m2	163	
Internal Link Dist (ft)	376		617			1043
Turn Bay Length (ft)			400			
Base Capacity (vph)	382	354	2470		436	2913
Starvation Cap Reductn	0	0	0		0	33
Spillback Cap Reductn	0	0	0		0	0
Storage Cap Reductn	0	0	0		0	0
Reduced v/c Ratio	0.05	0.05	0.41		0.36	0.81

#### Intersection Summary

Cycle Length: 120

Actuated Cycle Length: 120

Offset: 0 (0%), Referenced to phase 2:NBT and 6:SBTL, Start of Green, Master Intersection

Control Type: Actuated-Coordinated

Maximum v/c Ratio: 0.80

Intersection Signal Delay: 8.5

Intersection LOS: A

Intersection Capacity Utilization 72.5%

ICU Level of Service C

Analysis Period (min) 15

m Volume for 95th percentile queue is metered by upstream signal.

Splits and Phases: 2: Lynnway & Hanson St



	↑	↑	↑	↓	↓	↑	↑	↑	↓	↓	↑	↑
Lane Group	NBL	NBT	NBR	SBL	SBT	SBR	NEL	NET	NER	SWL	SWT	SWR
Lane Configurations	↑	↑			↑	↑	↑	↑↑		↑	↑↑	
Traffic Volume (vph)	25	0	5	5	0	5	25	900	20	70	2335	15
Future Volume (vph)	25	0	5	5	0	5	25	900	20	70	2335	15
Satd. Flow (prot)	1766	1580	0	0	1766	1580	1766	3521	0	1766	3529	0
Flt Permitted	0.754				0.754		0.048			0.257		
Satd. Flow (perm)	1402	1580	0	0	1402	1580	89	3521	0	478	3529	0
Satd. Flow (RTOR)		218				64		3			1	
Lane Group Flow (vph)	26	5	0	0	5	5	26	967	0	74	2471	0
Turn Type	Perm	NA		Perm	NA	Perm	pm+pt	NA		pm+pt	NA	
Protected Phases		8			4		5	2		1	6	
Permitted Phases	8				4		2			6		
Total Split (s)	32.0	32.0		32.0	32.0	32.0	12.0	76.0		12.0	76.0	
Total Lost Time (s)	6.0	6.0			6.0	6.0	5.0	5.0		5.0	5.0	
Act Efect Green (s)	18.0	18.0			17.8	17.8	91.8	87.2		92.8	90.6	
Actuated g/C Ratio	0.15	0.15			0.15	0.15	0.76	0.73		0.77	0.76	
v/c Ratio	0.12	0.01			0.02	0.02	0.16	0.38		0.17	0.93	
Control Delay	40.6	0.0			37.4	0.2	16.8	8.9		5.5	17.3	
Queue Delay	0.0	0.0			0.0	0.0	0.0	0.0		0.0	0.0	
Total Delay	40.6	0.0			37.4	0.2	16.8	8.9		5.5	17.3	
LOS	D	A			D	A	B	A		A	B	
Approach Delay		34.1			18.8			9.1			17.0	
Approach LOS		C			B			A			B	
Stops (vph)	21	0			6	0	15	256		16	952	
Fuel Used(gal)	0	0			0	0	0	11		1	49	
CO Emissions (g/hr)	31	1			7	1	28	785		84	3431	
NOx Emissions (g/hr)	6	0			1	0	5	153		16	668	
VOC Emissions (g/hr)	7	0			2	0	6	182		20	795	
Dilemma Vehicles (#)	0	0			0	0	0	37		0	72	
Queue Length 50th (ft)	16	0			3	0	6	155		15	~1200	
Queue Length 95th (ft)	42	0			14	0	m28	183		m14	m#1047	
Internal Link Dist (ft)		148			94			1043			1855	
Turn Bay Length (ft)							300			300		
Base Capacity (vph)	303	513			303	392	165	2559		444	2664	
Starvation Cap Reductn	0	0			0	0	0	0		0	0	
Spillback Cap Reductn	0	0			0	0	0	0		0	0	
Storage Cap Reductn	0	0			0	0	0	0		0	0	
Reduced v/c Ratio	0.09	0.01			0.02	0.01	0.16	0.38		0.17	0.93	

#### Intersection Summary

Cycle Length: 120

Actuated Cycle Length: 120

Offset: 98 (82%), Referenced to phase 2:NETL and 6:SWTL, Start of Green

Control Type: Actuated-Coordinated

Maximum v/c Ratio: 0.93

Intersection Signal Delay: 14.9

Intersection LOS: B

Intersection Capacity Utilization 85.5%

ICU Level of Service E

Analysis Period (min) 15

~ Volume exceeds capacity, queue is theoretically infinite.

Queue shown is maximum after two cycles.

# 95th percentile volume exceeds capacity, queue may be longer.

Queue shown is maximum after two cycles.

m Volume for 95th percentile queue is metered by upstream signal.

Splits and Phases: 3: Lynnway & Harding St





Lane Group	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations	↑	↑↑			↑↑	↑				↑	↑	↑
Traffic Volume (vph)	260	765	10	0	2100	275	0	0	0	245	95	535
Future Volume (vph)	260	765	10	0	2100	275	0	0	0	245	95	535
Satd. Flow (prot)	1766	3525	0	0	3532	1580	0	0	0	1766	1859	1580
Flt Permitted	0.056									0.950		
Satd. Flow (perm)	104	3525	0	0	3532	1580	0	0	0	1766	1859	1580
Satd. Flow (RTOR)		3				114						9
Lane Group Flow (vph)	273	815	0	0	2208	289	0	0	0	258	100	563
Turn Type	pm+pt	NA			NA	pt+ov				Prot	NA	pt+ov
Protected Phases	5	2			6	6 7				7	4	4 5
Permitted Phases	2											
Total Split (s)	19.0	90.0			71.0					30.0	30.0	
Total Lost Time (s)	4.0	4.0			4.0					4.0	4.0	
Act Efct Green (s)	86.0	86.0			67.0	97.0				26.0	26.0	45.0
Actuated g/C Ratio	0.72	0.72			0.56	0.81				0.22	0.22	0.38
v/c Ratio	0.97	0.32			1.12	0.22				0.68	0.25	0.94
Control Delay	72.6	5.9			75.9	1.7				53.1	40.9	61.3
Queue Delay	0.0	0.0			0.0	0.0				0.0	0.0	0.0
Total Delay	72.6	5.9			75.9	1.7				53.1	40.9	61.3
LOS	E	A			E	A				D	D	E
Approach Delay	22.6				67.3					56.8		
Approach LOS	C				E					E		
Stops (vph)	193	250			1918	47				228	79	468
Fuel Used(gal)	9	14			65	3				5	2	13
CO Emissions (g/hr)	634	970			4559	193				381	126	879
NOx Emissions (g/hr)	123	189			887	38				74	24	171
VOC Emissions (g/hr)	147	225			1057	45				88	29	204
Dilemma Vehicles (#)	0	82			11	0				0	4	0
Queue Length 50th (ft)	102	20			~1070	24				185	65	412
Queue Length 95th (ft)	#321	50			m#1130	m25				279	115	#643
Internal Link Dist (ft)	1855				1064			493		489		
Turn Bay Length (ft)	600				300					200		200
Base Capacity (vph)	282	2527			1972	1299				382	402	598
Starvation Cap Reductn	0	0			0	0				0	0	0
Spillback Cap Reductn	0	0			0	0				0	0	0
Storage Cap Reductn	0	0			0	0				0	0	0
Reduced v/c Ratio	0.97	0.32			1.12	0.22				0.68	0.25	0.94

#### Intersection Summary

Cycle Length: 120

Actuated Cycle Length: 120

Offset: 80 (67%), Referenced to phase 2:EBTL and 6:WBT, Start of Green

Control Type: Actuated-Coordinated

Maximum v/c Ratio: 1.12

Intersection Signal Delay: 54.4

Intersection LOS: D

Intersection Capacity Utilization 95.0%

ICU Level of Service F

Analysis Period (min) 15

~ Volume exceeds capacity, queue is theoretically infinite.

Queue shown is maximum after two cycles.

# 95th percentile volume exceeds capacity, queue may be longer.

Queue shown is maximum after two cycles.

m Volume for 95th percentile queue is metered by upstream signal.

Splits and Phases: 4: Commercial St & Lynnway



Lane Group	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations	↑	↑↑		↑	↑↑		↑	↑		↑	↑↑	
Traffic Volume (vph)	50	955	10	70	2215	45	10	0	5	35	10	15
Future Volume (vph)	50	955	10	70	2215	45	10	0	5	35	10	15
Satd. Flow (prot)	1766	3525	0	1766	3521	0	1766	1580	0	0	1745	0
Flt Permitted	0.050				0.242			0.759				0.823
Satd. Flow (perm)	93	3525	0	450	3521	0	1411	1580	0	0	1478	0
Satd. Flow (RTOR)		1			3			199				13
Lane Group Flow (vph)	53	1015	0	74	2376	0	11	5	0	0	64	0
Turn Type	pm+pt	NA		pm+pt	NA		Perm	NA		Perm	NA	
Protected Phases	5	2		1	6				8			4
Permitted Phases	2			6			8				4	
Total Split (s)	13.0	75.0		13.0	75.0		32.0	32.0		32.0	32.0	
Total Lost Time (s)	6.0	6.0		6.0	6.0		6.0	6.0			6.0	
Act Efect Green (s)	87.0	82.9		87.6	83.2		18.5	18.5			18.5	
Actuated g/C Ratio	0.72	0.69		0.73	0.69		0.15	0.15			0.15	
v/c Ratio	0.34	0.42		0.18	0.97		0.05	0.01			0.27	
Control Delay	26.4	3.0		3.7	23.6		38.2	0.0			35.8	
Queue Delay	0.0	0.0		0.0	1.3		0.0	0.0			0.0	
Total Delay	26.4	3.0		3.7	25.0		38.2	0.0			35.8	
LOS	C	A		A	C		D	A			D	
Approach Delay		4.2			24.3			26.3			35.8	
Approach LOS		A			C			C			D	
Stops (vph)	38	204		10	1049		10	0			42	
Fuel Used(gal)	1	10		0	30		0	0			1	
CO Emissions (g/hr)	69	718		33	2098		14	1			72	
NOx Emissions (g/hr)	13	140		6	408		3	0			14	
VOC Emissions (g/hr)	16	166		8	486		3	0			17	
Dilemma Vehicles (#)	0	3		0	72		0	0			3	
Queue Length 50th (ft)	6	95		7	~1141		7	0			32	
Queue Length 95th (ft)	m36	90		m8	#1285		23	0			72	
Internal Link Dist (ft)		1064			584			95			161	
Turn Bay Length (ft)	400			200								
Base Capacity (vph)	165	2435		405	2442		305	498			330	
Starvation Cap Reductn	0	0		0	25		0	0			0	
Spillback Cap Reductn	0	0		0	0		0	0			0	
Storage Cap Reductn	0	0		0	0		0	0			0	
Reduced v/c Ratio	0.32	0.42		0.18	0.98		0.04	0.01			0.19	

#### Intersection Summary

Cycle Length: 120

Actuated Cycle Length: 120

Offset: 45 (38%), Referenced to phase 2:EBTL and 6:WBTL, Start of Green

Control Type: Actuated-Coordinated

Maximum v/c Ratio: 0.97

Intersection Signal Delay: 18.5

Intersection LOS: B

Intersection Capacity Utilization 80.7%

ICU Level of Service D

Analysis Period (min) 15

~ Volume exceeds capacity, queue is theoretically infinite.

Queue shown is maximum after two cycles.

# 95th percentile volume exceeds capacity, queue may be longer.

Queue shown is maximum after two cycles.

m Volume for 95th percentile queue is metered by upstream signal.

Splits and Phases: 5: Marine Blvd/Sheppard St & Lynnway





Lane Group	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations		↑↑			↑↑		↑↑	↑↑		↑↑	↑↑	
Traffic Volume (vph)	0	1010	20	40	2170	95	10	5	15	25	20	50
Future Volume (vph)	0	1010	20	40	2170	95	10	5	15	25	20	50
Satd. Flow (prot)	0	3521	0	1766	3511	0	1766	1647	0	1766	1660	0
Flt Permitted					0.232			0.692			0.744	
Satd. Flow (perm)	0	3521	0	431	3511	0	1286	1647	0	1383	1660	0
Satd. Flow (RTOR)		3			9			16			14	
Lane Group Flow (vph)	0	1083	0	42	2382	0	11	21	0	26	74	0
Turn Type		NA		pm+pt	NA		Perm	NA		Perm	NA	
Protected Phases		2		1	6				8			4
Permitted Phases				6			8				4	
Total Split (s)		82.0			8.0	82.0		30.0	30.0		30.0	30.0
Total Lost Time (s)		4.0			4.0	4.0		4.0	4.0		4.0	4.0
Act Efct Green (s)		90.0			95.6	96.4		18.3	18.3		18.3	18.3
Actuated g/C Ratio		0.75			0.80	0.80		0.15	0.15		0.15	0.15
v/c Ratio		0.41			0.11	0.84		0.06	0.08		0.12	0.28
Control Delay		12.8			3.0	16.6		38.3	19.9		40.5	35.7
Queue Delay		0.0			0.0	11.6		0.0	0.0		0.0	0.0
Total Delay		12.8			3.0	28.2		38.3	19.9		40.5	35.7
LOS		B			A	C		D	B		D	D
Approach Delay		12.8				27.8			26.2			36.9
Approach LOS		B				C			C			D
Stops (vph)		363			4	940		10	10		21	49
Fuel Used(gal)		11			0	24		0	0		0	1
CO Emissions (g/hr)		734			16	1710		13	14		30	75
NOx Emissions (g/hr)		143			3	333		3	3		6	15
VOC Emissions (g/hr)		170			4	396		3	3		7	17
Dilemma Vehicles (#)		107			0	74		0	1		0	3
Queue Length 50th (ft)		187			2	304		7	3		16	38
Queue Length 95th (ft)		249			m7	#356		23	25		42	81
Internal Link Dist (ft)		584				233			259			262
Turn Bay Length (ft)				200								
Base Capacity (vph)		2642			388	2822		278	369		299	370
Starvation Cap Reductn		0			0	0		0	0		0	0
Spillback Cap Reductn		0			0	463		0	0		0	1
Storage Cap Reductn		0			0	0		0	0		0	0
Reduced v/c Ratio		0.41			0.11	1.01		0.04	0.06		0.09	0.20

#### Intersection Summary

Cycle Length: 120

Actuated Cycle Length: 120

Offset: 22 (18%), Referenced to phase 2:EBT and 6:WBTL, Start of Green

Control Type: Actuated-Coordinated

Maximum v/c Ratio: 0.84

Intersection Signal Delay: 23.5

Intersection LOS: C

Intersection Capacity Utilization 75.7%

ICU Level of Service D

Analysis Period (min) 15

# 95th percentile volume exceeds capacity, queue may be longer.

Queue shown is maximum after two cycles.

m Volume for 95th percentile queue is metered by upstream signal.

Splits and Phases: 15: Blossom St & Lynnway





Lane Group	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations	↑	↑↑		↑	↑↑↑		↑	↑				
Traffic Volume (vph)	55	975	40	95	2240	150	45	5	50	0	0	0
Future Volume (vph)	55	975	40	95	2240	150	45	5	50	0	0	0
Satd. Flow (prot)	1766	3511	0	1766	5029	0	1766	1604	0	0	0	0
Flt Permitted	0.048				0.222			0.950				
Satd. Flow (perm)	89	3511	0	413	5029	0	1766	1604	0	0	0	0
Satd. Flow (RTOR)		5				14			53			
Lane Group Flow (vph)	58	1067	0	100	2513	0	47	58	0	0	0	0
Turn Type	pm+pt	NA		pm+pt	NA		Perm	NA				
Protected Phases	5	2		1	6				8			
Permitted Phases	2			6			8					
Total Split (s)	20.0	70.0		20.0	70.0		30.0	30.0				
Total Lost Time (s)	4.0	4.0		4.0	4.0		4.0	4.0				
Act Efect Green (s)	91.3	84.0		93.1	87.5		18.1	18.1				
Actuated g/C Ratio	0.76	0.70		0.78	0.73		0.15	0.15				
v/c Ratio	0.35	0.43		0.25	0.68		0.18	0.20				
Control Delay	31.5	3.6		1.0	6.0		41.7	13.3				
Queue Delay	0.0	0.0		0.0	0.0		0.0	0.0				
Total Delay	31.5	3.6		1.0	6.0		41.7	13.3				
LOS	C	A		A	A		D	B				
Approach Delay		5.0			5.8			26.0				
Approach LOS		A			A			C				
Stops (vph)	19	345		3	1629		37	14				
Fuel Used(gal)	1	8		0	26		1	0				
CO Emissions (g/hr)	51	534		33	1824		55	28				
NOx Emissions (g/hr)	10	104		6	355		11	5				
VOC Emissions (g/hr)	12	124		8	423		13	6				
Dilemma Vehicles (#)	0	71		0	5		0	2				
Queue Length 50th (ft)	8	19		1	149		30	3				
Queue Length 95th (ft)	0	112		m1	m754		63	39				
Internal Link Dist (ft)		182			538			258				208
Turn Bay Length (ft)				300			150					
Base Capacity (vph)	294	2459		510	3671		382	389				
Starvation Cap Reductn	0	113		0	0		0	0				
Spillback Cap Reductn	0	0		0	0		0	0				
Storage Cap Reductn	0	0		0	0		0	0				
Reduced v/c Ratio	0.20	0.45		0.20	0.68		0.12	0.15				

#### Intersection Summary

Cycle Length: 120

Actuated Cycle Length: 120

Offset: 45 (38%), Referenced to phase 2:EBTL and 6:WBTL, Start of Green

Control Type: Actuated-Coordinated

Maximum v/c Ratio: 0.68

Intersection Signal Delay: 6.1

Intersection LOS: A

Intersection Capacity Utilization 64.3%

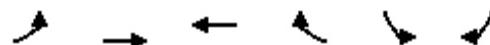
ICU Level of Service C

Analysis Period (min) 15

m Volume for 95th percentile queue is metered by upstream signal.

Splits and Phases: 6: Kingman St & Lynnway





Lane Group	EBL	EBT	WBT	WBR	SBL	SBR
Lane Configurations		↑↑			↖↖	
Traffic Volume (vph)	0	700	0	0	265	0
Future Volume (vph)	0	700	0	0	265	0
Satd. Flow (prot)	0	3532	0	0	3426	0
Flt Permitted					0.950	
Satd. Flow (perm)	0	3532	0	0	3426	0
Satd. Flow (RTOR)					521	
Lane Group Flow (vph)	0	736	0	0	279	0
Turn Type		NA			Prot	
Protected Phases		2			7	
Permitted Phases						
Total Split (s)		86.0			34.0	
Total Lost Time (s)		4.0			4.0	
Act Efct Green (s)		101.2			10.8	
Actuated g/C Ratio		0.84			0.09	
v/c Ratio		0.25			0.36	
Control Delay		1.7			13.0	
Queue Delay		0.0			0.1	
Total Delay		1.7			13.2	
LOS		A			B	
Approach Delay		1.7			13.2	
Approach LOS		A			B	
Stops (vph)		72			156	
Fuel Used(gal)		3			2	
CO Emissions (g/hr)		236			170	
NOx Emissions (g/hr)		46			33	
VOC Emissions (g/hr)		55			39	
Dilemma Vehicles (#)		5			0	
Queue Length 50th (ft)		28			41	
Queue Length 95th (ft)		37			m52	
Internal Link Dist (ft)		422	1272		197	
Turn Bay Length (ft)						
Base Capacity (vph)		2978			1247	
Starvation Cap Reductn		0			347	
Spillback Cap Reductn		0			0	
Storage Cap Reductn		0			0	
Reduced v/c Ratio		0.25			0.31	

#### Intersection Summary

Cycle Length: 120

Actuated Cycle Length: 120

Offset: 44 (37%), Referenced to phase 2:EBT, Start of Green

Control Type: Actuated-Coordinated

Maximum v/c Ratio: 0.36

Intersection Signal Delay: 4.8

Intersection LOS: A

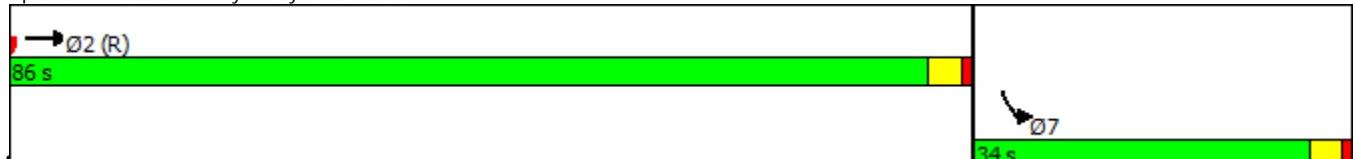
Intersection Capacity Utilization 51.7%

ICU Level of Service A

Analysis Period (min) 15

m Volume for 95th percentile queue is metered by upstream signal.

Splits and Phases: 7: Lynnway & Market St





Lane Group	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations	↑ ↘	↑↑ ↗		↑ ↘	↑↑↑ ↗					↔↔		
Traffic Volume (vph)	100	230	0	55	2210	200	0	0	0	80	210	185
Future Volume (vph)	100	230	0	55	2210	200	0	0	0	80	210	185
Satd. Flow (prot)	1766	3532	0	1766	5014	0	0	0	0	0	3297	0
Flt Permitted	0.950			0.950							0.992	
Satd. Flow (perm)	1766	3532	0	1766	5014	0	0	0	0	0	3297	0
Satd. Flow (RTOR)					16						99	
Lane Group Flow (vph)	105	242	0	58	2534	0	0	0	0	0	500	0
Turn Type	Prot	NA		Prot	NA					Perm	NA	
Protected Phases	5	2		1	6						8	
Permitted Phases												8
Total Split (s)	11.0	58.0		14.0	61.0					21.0	21.0	
Total Lost Time (s)	4.0	5.0		5.0	5.0						5.0	
Act Efect Green (s)	9.6	53.0		19.8	64.2						16.0	
Actuated g/C Ratio	0.08	0.44		0.16	0.54						0.13	
v/c Ratio	0.74	0.16		0.20	0.94						0.95	
Control Delay	72.9	31.9		63.9	26.4						70.7	
Queue Delay	0.0	0.0		0.0	0.0						0.0	
Total Delay	72.9	31.9		63.9	26.4						70.7	
LOS	E	C		E	C						E	
Approach Delay		44.4			27.3						70.7	
Approach LOS		D			C						E	
Stops (vph)	80	191		51	1560						353	
Fuel Used(gal)	3	4		1	39						11	
CO Emissions (g/hr)	179	279		99	2694						754	
NOx Emissions (g/hr)	35	54		19	524						147	
VOC Emissions (g/hr)	41	65		23	624						175	
Dilemma Vehicles (#)	0	20		0	112						19	
Queue Length 50th (ft)	~87	86		43	~801						166	
Queue Length 95th (ft)	#206	142		m60	#920						#276	
Internal Link Dist (ft)		524			685			197			249	
Turn Bay Length (ft)	190			200								
Base Capacity (vph)	142	1559		291	2688						525	
Starvation Cap Reductn	0	0		0	0						0	
Spillback Cap Reductn	0	0		0	0						0	
Storage Cap Reductn	0	0		0	0						0	
Reduced v/c Ratio	0.74	0.16		0.20	0.94						0.95	

**Intersection Summary**

Cycle Length: 120

Actuated Cycle Length: 120

Offset: 10 (8%), Referenced to phase 2:EBT and 6:WBT, Start of Green

Control Type: Actuated-Coordinated

Maximum v/c Ratio: 0.95

Intersection Signal Delay: 35.3

Intersection LOS: D

Intersection Capacity Utilization 76.4%

ICU Level of Service D

Analysis Period (min) 15

~ Volume exceeds capacity, queue is theoretically infinite.

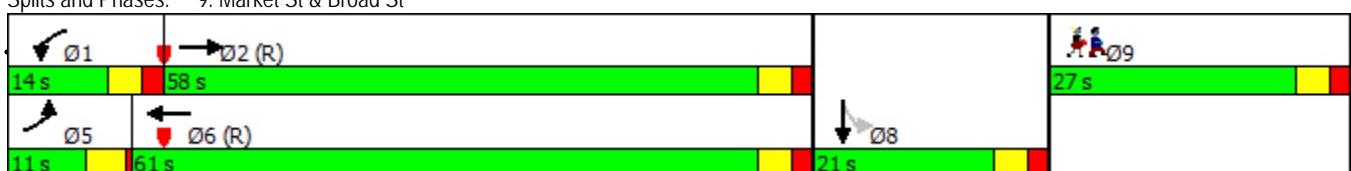
Queue shown is maximum after two cycles.

# 95th percentile volume exceeds capacity, queue may be longer.

Queue shown is maximum after two cycles.

m Volume for 95th percentile queue is metered by upstream signal.

Splits and Phases: 9: Market St &amp; Broad St





Lane Group	EBL	EBT	WBT	WBR2	NBL2	NBL	NBT	NBR	Ø9
Lane Configurations		↑↑	↑↑		↑↑		↑↑		
Traffic Volume (vph)	50	260	615	30	1700	190	70	15	
Future Volume (vph)	50	260	615	30	1700	190	70	15	
Satd. Flow (prot)	0	3504	3507	0	3214	0	1616	0	
Flt Permitted					0.950		0.958		
Satd. Flow (perm)	0	2391	3507	0	3214	0	1616	0	
Satd. Flow (RTOR)				73			1		
Lane Group Flow (vph)	0	326	679	0	1377	0	701	0	
Turn Type	Perm	NA	NA		Perm	Perm	NA		
Protected Phases		2	6				8		9
Permitted Phases	2				8	8			
Total Split (s)	33.0	33.0	33.0		63.0	63.0	63.0		24.0
Total Lost Time (s)			7.0	7.0		5.0			5.0
Act Efct Green (s)	45.7	45.7			57.5		57.5		
Actuated g/C Ratio	0.38	0.38			0.48		0.48		
v/c Ratio	0.36	0.49			0.89		0.90		
Control Delay	25.1	28.4			37.3		45.6		
Queue Delay	0.0	0.1			3.3		6.0		
Total Delay	25.1	28.5			40.6		51.6		
LOS	C	C			D		D		
Approach Delay	25.1	28.5				44.3			
Approach LOS	C	C				D			
Stops (vph)	234	439			1155		581		
Fuel Used(gal)	5	12			31		17		
CO Emissions (g/hr)	358	848			2189		1191		
NOx Emissions (g/hr)	70	165			426		232		
VOC Emissions (g/hr)	83	196			507		276		
Dilemma Vehicles (#)	18	27			0		26		
Queue Length 50th (ft)	108	174			515		528		
Queue Length 95th (ft)	m152	#316			631		#807		
Internal Link Dist (ft)	685	345				1215			
Turn Bay Length (ft)									
Base Capacity (vph)	910	1380			1553		781		
Starvation Cap Reductn	0	0			0		0		
Spillback Cap Reductn	0	105			107		53		
Storage Cap Reductn	0	0			0		0		
Reduced v/c Ratio	0.36	0.53			0.95		0.96		

#### Intersection Summary

Cycle Length: 120

Actuated Cycle Length: 120

Offset: 69 (58%), Referenced to phase 2:EBTL and 6:WBT, Start of Green

Control Type: Actuated-Coordinated

Maximum v/c Ratio: 0.90

Intersection Signal Delay: 38.8

Intersection LOS: D

Intersection Capacity Utilization 76.9%

ICU Level of Service D

Analysis Period (min) 15

# 95th percentile volume exceeds capacity, queue may be longer.

Queue shown is maximum after two cycles.

m Volume for 95th percentile queue is metered by upstream signal.

Splits and Phases: 10: Washington St & Broad St & Spring St



Intersection							
Approach	WB		SB		NE		
Entry Lanes		2		2		2	
Conflicting Circle Lanes		2		2		2	
Adj Approach Flow, veh/h	1546		1009		526		
Demand Flow Rate, veh/h	1608		1049		547		
Vehicles Circulating, veh/h	612		77		913		
Vehicles Exiting, veh/h	848		2143		77		
Follow-Up Headway, s	3.186		3.186		3.186		
Ped Vol Crossing Leg, #/h	0		0		0		
Ped Cap Adj	1.000		1.000		1.000		
Approach Delay, s/veh	92.5		7.8		14.5		
Approach LOS	F		A		B		
Lane	Left	Right	Left	Right	Bypass	Left	Right
Designated Moves	LTR	R	L	LTR	R	L	LTR
Assumed Moves	LTR	R	L	LTR	R	L	LTR
RT Channelized					Yield		
Lane Util	0.470	0.530	0.530	0.470		0.530	0.470
Critical Headway, s	4.293	4.113	4.293	4.113		4.293	4.113
Entry Flow, veh/h	756	852	484	429	136	290	257
Cap Entry Lane, veh/h	714	736	1067	1071	1071	570	596
Entry HV Adj Factor	0.961	0.962	0.961	0.961	0.962	0.961	0.962
Flow Entry, veh/h	727	819	465	412	131	279	247
Cap Entry, veh/h	686	708	1025	1029	1029	548	574
V/C Ratio	1.059	1.157	0.454	0.401	0.127	0.509	0.431
Control Delay, s/veh	75.2	107.9	8.7	7.8	4.6	15.7	13.1
LOS	F	F	A	A	A	C	B
95th %tile Queue, veh	19	26	2	2	0	3	2



Lynnway-Route 1A-Carroll Parkway Study  
2: Lynnway & Hanson St

Alternative 5: 2040 PM

5:00 pm



Lane Group	WBL	WBR	NBT	NBR	SBL	SBT
Lane Configurations	↑ ↗	↗ ↗	↑ ↗	↗ ↗	↗	↑ ↗
Traffic Volume (vph)	75	100	2140	50	225	1065
Future Volume (vph)	75	100	2140	50	225	1065
Satd. Flow (prot)	1711	1531	3411	0	1711	3421
Flt Permitted	0.950				0.047	
Satd. Flow (perm)	1711	1531	3411	0	85	3421
Satd. Flow (RTOR)			105	3		
Lane Group Flow (vph)	79	105	2303	0	237	1120
Turn Type	Prot	Perm	NA		pm+pt	NA
Protected Phases	8		2		1	6
Permitted Phases			8		6	
Total Split (s)	31.0	31.0	74.0		15.0	89.0
Total Lost Time (s)	5.0	5.0	5.0		5.0	4.0
Act Effct Green (s)	15.7	15.7	79.3		94.3	95.3
Actuated g/C Ratio	0.13	0.13	0.66		0.79	0.79
v/c Ratio	0.35	0.36	1.02		1.17	0.41
Control Delay	48.9	10.8	42.4		140.5	4.9
Queue Delay	0.0	0.0	0.1		0.0	0.0
Total Delay	48.9	10.8	42.6		140.5	4.9
LOS	D	B	D		F	A
Approach Delay	27.2		42.6		28.6	
Approach LOS	C		D		C	
Queue Length 50th (ft)	59	0	774		-155	65
Queue Length 95th (ft)	95	46	#1256		#337	173
Internal Link Dist (ft)	376		617		1043	
Turn Bay Length (ft)	200				400	
Base Capacity (vph)	370	413	2254		202	2716
Starvation Cap Reductn	0	0	1		0	0
Spillback Cap Reductn	0	0	0		0	0
Storage Cap Reductn	0	0	0		0	0
Reduced v/c Ratio	0.21	0.25	1.02		1.17	0.41

#### Intersection Summary

Cycle Length: 120

Actuated Cycle Length: 120

Offset: 0 (0%), Referenced to phase 2:NBT and 6:SBTL, Start of Green, Master Intersection

Control Type: Actuated-Coordinated

Maximum v/c Ratio: 1.17

Intersection Signal Delay: 36.9

Intersection LOS: D

Intersection Capacity Utilization 91.4%

ICU Level of Service F

Analysis Period (min) 15

~ Volume exceeds capacity, queue is theoretically infinite.

Queue shown is maximum after two cycles.

# 95th percentile volume exceeds capacity, queue may be longer.

Queue shown is maximum after two cycles.

Splits and Phases: 2: Lynnway & Hanson St



Lynnway-Route 1A-Carroll Parkway Study  
3: Lynnway & Harding St

Alternative 5: 2040 PM

5:00 pm



Lane Group	NBL	NBT	NBR	SBL	SBT	SBR	NEL	NET	NER	SWL	SWT	SWR
Lane Configurations	↑	↑	↑	↓	↑	↑	↑	↑	↑	↑	↑	↑
Traffic Volume (vph)	40	0	40	30	0	5	45	2230	65	165	1195	65
Future Volume (vph)	40	0	40	30	0	5	45	2230	65	165	1195	65
Satd. Flow (prot)	1711	1531	0	0	1711	1531	1711	3408	0	1711	3394	0
Flt Permitted	0.736				0.730		0.154			0.049		
Satd. Flow (perm)	1325	1531	0	0	1314	1531	277	3408	0	88	3394	0
Satd. Flow (RTOR)		105				64		4			8	
Lane Group Flow (vph)	42	42	0	0	32	5	47	2413	0	174	1325	0
Turn Type	Perm	NA		Perm	NA	Perm	pm+pt	NA		pm+pt	NA	
Protected Phases		8				4		5	2		1	6
Permitted Phases	8				4		4	2			6	
Total Split (s)	32.0	32.0		32.0	32.0	32.0	12.0	73.0		15.0	76.0	
Total Lost Time (s)	6.0	6.0			6.0	6.0	5.0	5.0		5.0	5.0	
Act Effct Green (s)	18.2	18.2			18.2	18.2	85.6	78.6		91.5	84.5	
Actuated g/C Ratio	0.15	0.15			0.15	0.15	0.71	0.66		0.76	0.70	
v/c Ratio	0.21	0.13			0.16	0.02	0.17	1.08		0.89	0.55	
Control Delay	42.8	0.9			41.6	0.2	1.8	52.3		69.4	3.6	
Queue Delay	0.0	0.0			0.0	0.0	0.0	0.0		0.0	0.0	
Total Delay	42.8	0.9			41.6	0.2	1.8	52.3		69.4	3.6	
LOS	D	A			D	A	A	D		E	A	
Approach Delay		21.8			36.0			51.4			11.3	
Approach LOS		C			D			D			B	
Queue Length 50th (ft)	27	0			20	0	7	~1250		103	50	
Queue Length 95th (ft)	59	0			49	0	m1 m#1213		m#139	m55		
Internal Link Dist (ft)		148			94			1043			1857	
Turn Bay Length (ft)							300			300		
Base Capacity (vph)	287	413		284	381	281	2234		202	2392		
Starvation Cap Reductn	0	0		0	0	0	0		0	0		
Spillback Cap Reductn	0	0		0	0	0	0		0	0		
Storage Cap Reductn	0	0		0	0	0	0		0	0		
Reduced v/c Ratio	0.15	0.10			0.11	0.01	0.17	1.08		0.86	0.55	

#### Intersection Summary

Cycle Length: 120

Actuated Cycle Length: 120

Offset: 25 (21%), Referenced to phase 2:NETL and 6:SWTL, Start of Green

Control Type: Actuated-Coordinated

Maximum v/c Ratio: 1.08

Intersection Signal Delay: 35.9

Intersection LOS: D

Intersection Capacity Utilization 96.6%

ICU Level of Service F

Analysis Period (min) 15

~ Volume exceeds capacity, queue is theoretically infinite.

Queue shown is maximum after two cycles.

# 95th percentile volume exceeds capacity, queue may be longer.

Queue shown is maximum after two cycles.

m Volume for 95th percentile queue is metered by upstream signal.

Splits and Phases: 3: Lynnway & Harding St



Lynnway-Route 1A-Carroll Parkway Study  
4: Commercial St & Lynnway

Alternative 5: 2040 PM

5:00 pm

Lane Group	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations	↑	↑↑			↑↑	↑				↑	↑	↑
Traffic Volume (vph)	540	1950	5	0	1095	295	0	0	0	340	25	285
Future Volume (vph)	540	1950	5	0	1095	295	0	0	0	340	25	285
Satd. Flow (prot)	1711	3421	0	0	3421	1531	0	0	0	1711	1801	1531
Flt Permitted	0.950									0.950		
Satd. Flow (perm)	1711	3421	0	0	3421	1531	0	0	0	1711	1801	1531
Satd. Flow (RTOR)						310						15
Lane Group Flow (vph)	568	2056	0	0	1151	310	0	0	0	358	26	300
Turn Type	Prot	NA			NA	Perm				Perm	NA	pt+ov
Protected Phases	5	2			6					4	4	5
Permitted Phases					6					4		
Total Split (s)	42.0	90.0			48.0	48.0				30.0	30.0	
Total Lost Time (s)	4.0	4.0			4.0	4.0				4.0	4.0	
Act Effct Green (s)	38.0	86.0			44.0	44.0				26.0	26.0	68.0
Actuated g/C Ratio	0.32	0.72			0.37	0.37				0.22	0.22	0.57
v/c Ratio	1.05	0.84			0.92	0.41				0.97	0.07	0.34
Control Delay	70.3	12.2			37.4	5.3				86.4	38.1	14.6
Queue Delay	0.0	0.0			0.0	0.0				0.0	0.0	0.0
Total Delay	70.3	12.2			37.4	5.3				86.4	38.1	14.6
LOS	E	B			D	A				F	D	B
Approach Delay	24.8				30.6						53.1	
Approach LOS	C				C						D	
Queue Length 50th (ft)	~469	27			237	0				277	16	113
Queue Length 95th (ft)	m#386	m28			#563	81				#467	41	172
Internal Link Dist (ft)	1857				1085			493			489	
Turn Bay Length (ft)	600				300					200		200
Base Capacity (vph)	541	2451			1254	757				370	390	874
Starvation Cap Reductn	0	0			0	0				0	0	0
Spillback Cap Reductn	0	0			0	0				0	0	0
Storage Cap Reductn	0	0			0	0				0	0	0
Reduced v/c Ratio	1.05	0.84			0.92	0.41				0.97	0.07	0.34

Intersection Summary

Cycle Length: 120

Actuated Cycle Length: 120

Offset: 108 (90%), Referenced to phase 2:EBT and 6:WBT, Start of Green

Control Type: Actuated-Coordinated

Maximum v/c Ratio: 1.05

Intersection Signal Delay: 30.6

Intersection LOS: C

Intersection Capacity Utilization 90.6%

ICU Level of Service E

Analysis Period (min) 15

~ Volume exceeds capacity, queue is theoretically infinite.

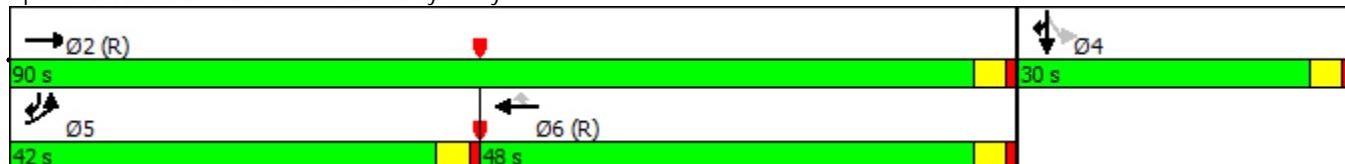
Queue shown is maximum after two cycles.

# 95th percentile volume exceeds capacity, queue may be longer.

Queue shown is maximum after two cycles.

m Volume for 95th percentile queue is metered by upstream signal.

Splits and Phases: 4: Commercial St & Lynnway



Lynnway-Route 1A-Carroll Parkway Study  
5: Marine Blvd/Sheppard St & Lynnway

Alternative 5: 2040 PM

5:00 pm

Lane Group	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations	↑	↑↑		↑	↑↑		↑	↑			↔	
Traffic Volume (vph)	105	2175	20	35	1345	20	20	5	10	40	5	25
Future Volume (vph)	105	2175	20	35	1345	20	20	5	10	40	5	25
Satd. Flow (prot)	1711	3418	0	1711	3414	0	1711	1615	0	0	1666	0
Flt Permitted	0.129				0.050			0.738				0.813
Satd. Flow (perm)	232	3418	0	90	3414	0	1329	1615	0	0	1394	0
Satd. Flow (RTOR)		1				2			11			21
Lane Group Flow (vph)	110	2308	0	37	1435	0	21	16	0	0	73	0
Turn Type	pm+pt	NA		pm+pt	NA		Perm	NA		Perm	NA	
Protected Phases	5	2		1	6				8			4
Permitted Phases	2			6			8				4	
Total Split (s)	15.0	75.0		13.0	73.0		32.0	32.0		32.0	32.0	
Total Lost Time (s)	6.0	6.0		6.0	6.0		6.0	6.0			6.0	
Act Effct Green (s)	92.4	88.7		89.0	82.0		15.3	15.3			15.3	
Actuated g/C Ratio	0.77	0.74		0.74	0.68		0.13	0.13			0.13	
v/c Ratio	0.41	0.91		0.23	0.62		0.12	0.07			0.37	
Control Delay	5.8	15.3		19.2	5.8		43.0	23.8			37.3	
Queue Delay	0.0	0.9		0.0	0.1		0.0	0.0			0.0	
Total Delay	5.8	16.2		19.2	5.9		43.0	23.8			37.3	
LOS	A	B		B	A		D	C			D	
Approach Delay		15.8			6.2			34.7			37.3	
Approach LOS		B			A			C			D	
Queue Length 50th (ft)	1	157		1	28		15	4			39	
Queue Length 95th (ft)	m22	m#1248		m15	352		36	23			76	
Internal Link Dist (ft)		1085			554			123			133	
Turn Bay Length (ft)	250		200									
Base Capacity (vph)	290	2526		161	2333		287	358			318	
Starvation Cap Reductn	0	0		0	111		0	0			0	
Spillback Cap Reductn	0	68		0	0		0	0			0	
Storage Cap Reductn	0	0		0	0		0	0			0	
Reduced v/c Ratio	0.38	0.94		0.23	0.65		0.07	0.04			0.23	

Intersection Summary

Cycle Length: 120

Actuated Cycle Length: 120

Offset: 94 (78%), Referenced to phase 2:EBTL and 6:WBTL, Start of Green

Control Type: Actuated-Coordinated

Maximum v/c Ratio: 0.91

Intersection Signal Delay: 12.8

Intersection LOS: B

Intersection Capacity Utilization 93.6%

ICU Level of Service F

Analysis Period (min) 15

# 95th percentile volume exceeds capacity, queue may be longer.

Queue shown is maximum after two cycles.

m Volume for 95th percentile queue is metered by upstream signal.

Splits and Phases: 5: Marine Blvd/Sheppard St & Lynnway



Lynnway-Route 1A-Carroll Parkway Study  
15: Blossom St & Lynnway

Alternative 5: 2040 PM

5:00 pm



Lane Group	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Traffic Volume (vph)	0	2205	25	10	1250	155	20	10	25	30	10	80
Future Volume (vph)	0	2205	25	10	1250	155	20	10	25	30	10	80
Satd. Flow (prot)	0	3414	0	1711	3363	0	1711	1612	0	1711	1561	0
Flt Permitted				0.044				0.669			0.733	
Satd. Flow (perm)	0	3414	0	79	3363	0	1205	1612	0	1320	1561	0
Satd. Flow (RTOR)		2			27			26			84	
Lane Group Flow (vph)	0	2345	0	11	1477	0	21	37	0	32	95	0
Turn Type	NA		pm+pt	NA			Perm	NA		Perm	NA	
Protected Phases	2		1	6				8			4	
Permitted Phases			6				8				4	
Total Split (s)	80.0		9.0	89.0			31.0	31.0		31.0	31.0	
Total Lost Time (s)	5.0		5.0	5.0			5.0	5.0		5.0	5.0	
Act Effct Green (s)	90.1		91.9	91.9			18.1	18.1		18.1	18.1	
Actuated g/C Ratio	0.75		0.77	0.77			0.15	0.15		0.15	0.15	
v/c Ratio	0.91		0.09	0.57			0.12	0.14		0.16	0.31	
Control Delay	14.4		3.0	4.0			40.5	19.5		41.6	13.1	
Queue Delay	0.9		0.0	0.2			0.0	0.0		0.0	0.0	
Total Delay	15.3		3.0	4.1			40.5	19.5		41.6	13.1	
LOS	B		A	A			D	B		D	B	
Approach Delay	15.3			4.1				27.1			20.3	
Approach LOS	B			A			C			C		
Queue Length 50th (ft)	172		1	77			13	7		20	7	
Queue Length 95th (ft)	#1197		m1	52			36	36		49	52	
Internal Link Dist (ft)	554			508				259			262	
Turn Bay Length (ft)			200									
Base Capacity (vph)	2564		122	2582			261	369		286	404	
Starvation Cap Reductn	0		0	306			0	0		0	0	
Spillback Cap Reductn	66		0	53			0	0		0	1	
Storage Cap Reductn	0		0	0			0	0		0	0	
Reduced v/c Ratio	0.94		0.09	0.65			0.08	0.10		0.11	0.24	

Intersection Summary

Cycle Length: 120

Actuated Cycle Length: 120

Offset: 84 (70%), Referenced to phase 2:EBT and 6:WBTL, Start of Green

Control Type: Actuated-Coordinated

Maximum v/c Ratio: 0.91

Intersection Signal Delay: 11.5

Intersection LOS: B

Intersection Capacity Utilization 79.7%

ICU Level of Service D

Analysis Period (min) 15

# 95th percentile volume exceeds capacity, queue may be longer.

Queue shown is maximum after two cycles.

m Volume for 95th percentile queue is metered by upstream signal.

Splits and Phases: 15: Blossom St & Lynnway



Lynnway-Route 1A-Carroll Parkway Study  
6: Kingman St & Lynnway

Alternative 5: 2040 PM

5:00 pm



Lane Group	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations	↑	↑↑		↑	↑↑		↑	↑				
Traffic Volume (vph)	65	2085	35	75	1290	40	100	0	115	0	0	0
Future Volume (vph)	65	2085	35	75	1290	40	100	0	115	0	0	0
Satd. Flow (prot)	1711	3414	0	1711	3404	0	1711	1531	0	0	0	0
Flt Permitted	0.145				0.048			0.950				
Satd. Flow (perm)	261	3414	0	86	3404	0	1711	1531	0	0	0	0
Satd. Flow (RTOR)			3			5			93			
Lane Group Flow (vph)	68	2229	0	79	1398	0	105	121	0	0	0	0
Turn Type	pm+pt	NA		pm+pt	NA		Split		NA			
Protected Phases	5	2		1	6		8		8			
Permitted Phases	2			6								
Total Split (s)	14.0	80.0		10.0	76.0		30.0	30.0				
Total Lost Time (s)	4.0	4.0		4.0	4.0		4.0	4.0				
Act Effct Green (s)	96.5	87.4		90.2	84.2		16.6	16.6				
Actuated g/C Ratio	0.80	0.73		0.75	0.70		0.14	0.14				
v/c Ratio	0.21	0.90		0.54	0.59		0.44	0.41				
Control Delay	6.7	17.5		40.4	5.2		51.1	17.3				
Queue Delay	0.0	0.9		0.0	0.0		0.0	0.0				
Total Delay	6.7	18.4		40.4	5.3		51.1	17.3				
LOS	A	B		D	A		D	B				
Approach Delay		18.0			7.1			33.0				
Approach LOS		B			A			C				
Queue Length 50th (ft)	10	344		22	40		79	20				
Queue Length 95th (ft)	m17	#1093		m43	m530		121	69				
Internal Link Dist (ft)		508			531			258				98
Turn Bay Length (ft)	200		300									
Base Capacity (vph)	332	2486		146	2389		370	404				
Starvation Cap Reductn	0	86		0	0		0	0				
Spillback Cap Reductn	0	0		0	42		0	0				
Storage Cap Reductn	0	0		0	0		0	0				
Reduced v/c Ratio	0.20	0.93		0.54	0.60		0.28	0.30				

Intersection Summary

Cycle Length: 120

Actuated Cycle Length: 120

Offset: 65 (54%), Referenced to phase 2:EBTL and 6:WBTL, Start of Green

Control Type: Actuated-Coordinated

Maximum v/c Ratio: 0.90

Intersection Signal Delay: 14.9

Intersection LOS: B

Intersection Capacity Utilization 77.5%

ICU Level of Service D

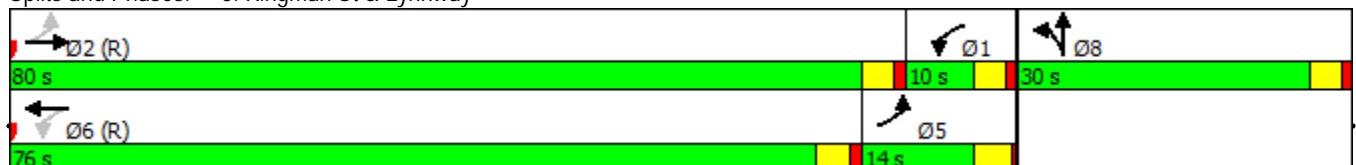
Analysis Period (min) 15

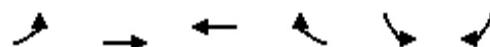
# 95th percentile volume exceeds capacity, queue may be longer.

Queue shown is maximum after two cycles.

m Volume for 95th percentile queue is metered by upstream signal.

Splits and Phases: 6: Kingman St & Lynnway





Lane Group	EBL	EBT	WBT	WBR	SBL	SBR	Ø5	Ø6
Lane Configurations		↑↑			↑↑			
Traffic Volume (vph)	0	1450	0	0	500	0		
Future Volume (vph)	0	1450	0	0	500	0		
Satd. Flow (prot)	0	3421	0	0	3319	0		
Flt Permitted					0.950			
Satd. Flow (perm)	0	3421	0	0	3319	0		
Satd. Flow (RTOR)					136			
Lane Group Flow (vph)	0	1525	0	0	526	0		
Turn Type		NA			Prot			
Protected Phases		2			7		5	6
Permitted Phases								
Total Split (s)		93.0			27.0		48.0	45.0
Total Lost Time (s)		4.0			4.0			
Act Effct Green (s)		92.7			19.3			
Actuated g/C Ratio		0.77			0.16			
v/c Ratio		0.58			0.81			
Control Delay		13.2			11.9			
Queue Delay		0.0			1.1			
Total Delay		13.2			13.1			
LOS		B			B			
Approach Delay		13.2			13.1			
Approach LOS		B			B			
Queue Length 50th (ft)		322			1			
Queue Length 95th (ft)		708			m4			
Internal Link Dist (ft)	384	1232			273			
Turn Bay Length (ft)								
Base Capacity (vph)		2643			746			
Starvation Cap Reductn		0			75			
Spillback Cap Reductn		0			0			
Storage Cap Reductn		0			0			
Reduced v/c Ratio		0.58			0.78			

#### Intersection Summary

Cycle Length: 120

Actuated Cycle Length: 120

Offset: 116 (97%), Referenced to phase 2:EBT and 6:Hold, Start of Green

Control Type: Actuated-Coordinated

Maximum v/c Ratio: 0.81

Intersection Signal Delay: 13.2

Intersection LOS: B

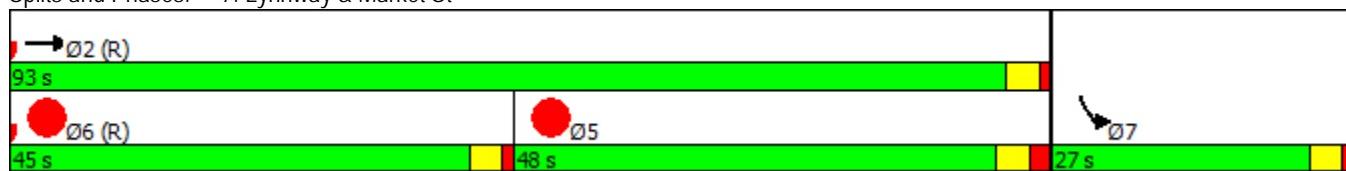
Intersection Capacity Utilization 62.1%

ICU Level of Service B

Analysis Period (min) 15

m Volume for 95th percentile queue is metered by upstream signal.

Splits and Phases: 7: Lynnway & Market St



Lynnway-Route 1A-Carroll Parkway Study  
9: Market St & Broad St

Alternative 5: 2040 PM  
5:00 pm

Lane Group	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations	↑	↑↑		↑	↑↑↑					↔↔		
Traffic Volume (vph)	230	570	0	50	1010	235	0	0	0	90	450	250
Future Volume (vph)	230	570	0	50	1010	235	0	0	0	90	450	250
Satd. Flow (prot)	1711	3421	0	1711	4778	0	0	0	0	0	3241	0
Flt Permitted	0.950				0.950						0.994	
Satd. Flow (perm)	1711	3421	0	1711	4778	0	0	0	0	0	3241	0
Satd. Flow (RTOR)						45						59
Lane Group Flow (vph)	242	599	0	53	1309	0	0	0	0	0	831	0
Turn Type	Prot	NA		Prot	NA					Perm	NA	
Protected Phases	5	2		1	6							8
Permitted Phases												8
Total Split (s)	21.0	46.0		14.0	39.0					33.0	33.0	
Total Lost Time (s)	4.0	5.0		5.0	5.0						5.0	
Act Effct Green (s)	19.5	54.6		8.3	42.3						28.0	
Actuated g/C Ratio	0.16	0.46		0.07	0.35						0.23	
v/c Ratio	0.87	0.38		0.45	0.76						1.04	
Control Delay	60.3	22.6		51.5	24.6						83.7	
Queue Delay	0.0	0.0		0.0	0.0						0.0	
Total Delay	60.3	22.6		51.5	24.6						83.7	
LOS	E	C		D	C						F	
Approach Delay		33.4			25.6						83.7	
Approach LOS		C			C						F	
Queue Length 50th (ft)	185	217		39	341						-345	
Queue Length 95th (ft)	m#247	m252		m70	#465						#475	
Internal Link Dist (ft)		520			712			273			249	
Turn Bay Length (ft)	200			200								
Base Capacity (vph)	277	1556		128	1714						801	
Starvation Cap Reductn	0	0		0	0						0	
Spillback Cap Reductn	0	0		0	0						0	
Storage Cap Reductn	0	0		0	0						0	
Reduced v/c Ratio	0.87	0.38		0.41	0.76						1.04	

#### Intersection Summary

Cycle Length: 120

Actuated Cycle Length: 120

Offset: 41 (34%), Referenced to phase 2:EBT and 6:WBT, Start of Green

Control Type: Actuated-Coordinated

Maximum v/c Ratio: 1.04

Intersection Signal Delay: 43.7

Intersection LOS: D

Intersection Capacity Utilization 73.4%

ICU Level of Service D

Analysis Period (min) 15

~ Volume exceeds capacity, queue is theoretically infinite.

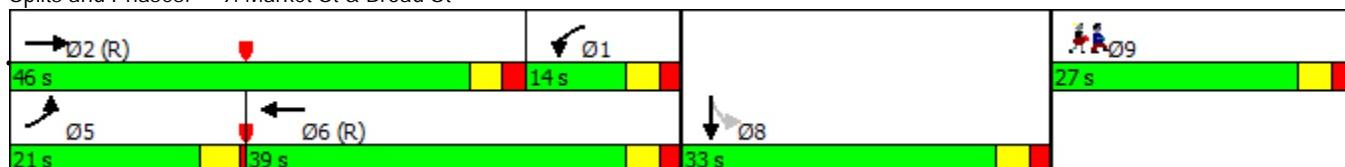
Queue shown is maximum after two cycles.

# 95th percentile volume exceeds capacity, queue may be longer.

Queue shown is maximum after two cycles.

m Volume for 95th percentile queue is metered by upstream signal.

Splits and Phases: 9: Market St & Broad St





Lane Group	EBL	EBT	WBT	WBR2	NBL2	NBL	NBT	NBR	Ø9
Lane Configurations		↑↑	↑↑		↑↑		↑		
Traffic Volume (vph)	15	570	395	5	900	135	75	25	
Future Volume (vph)	15	570	395	5	900	135	75	25	
Satd. Flow (prot)	0	3418	3414	0	3319	0	1722	0	
Flt Permitted		0.937			0.950		0.972		
Satd. Flow (perm)	0	3206	3414	0	3319	0	1722	0	
Satd. Flow (RTOR)			73				6		
Lane Group Flow (vph)	0	615	420	0	946	0	247	0	
Turn Type	Perm	NA	NA		Perm	Perm	NA		
Protected Phases		2	6				8		9
Permitted Phases	2				8	8			
Total Split (s)	43.0	43.0	43.0		54.0	54.0	54.0		23.0
Total Lost Time (s)		7.0	7.0		6.0		6.0		
Act Effct Green (s)	59.7	59.7			42.7		42.7		
Actuated g/C Ratio	0.50	0.50			0.36		0.36		
v/c Ratio	0.39	0.24			0.80		0.40		
Control Delay	27.8	16.9			40.3		29.6		
Queue Delay	0.0	0.0			0.0		0.0		
Total Delay	27.8	16.9			40.3		29.6		
LOS	C	B			D		C		
Approach Delay	27.8	16.9				38.1			
Approach LOS	C	B				D			
Queue Length 50th (ft)	238	72			331		137		
Queue Length 95th (ft)	m296	158			389		198		
Internal Link Dist (ft)	712	345				1199			
Turn Bay Length (ft)									
Base Capacity (vph)	1595	1735			1327		692		
Starvation Cap Reductn	0	0			0		0		
Spillback Cap Reductn	0	0			0		0		
Storage Cap Reductn	0	0			0		0		
Reduced v/c Ratio	0.39	0.24			0.71		0.36		

#### Intersection Summary

Cycle Length: 120

Actuated Cycle Length: 120

Offset: 81 (68%), Referenced to phase 2:EBTL and 6:WBT, Start of Green

Control Type: Actuated-Coordinated

Maximum v/c Ratio: 0.80

Intersection Signal Delay: 31.2

Intersection LOS: C

Intersection Capacity Utilization 64.1%

ICU Level of Service C

Analysis Period (min) 15

m Volume for 95th percentile queue is metered by upstream signal.

Splits and Phases: 10: Washington St & Broad St & Spring St



Intersection							
Approach	WB		SB		NE		
Entry Lanes	2		2		2		
Conflicting Circle Lanes	2		2		2		
Adj Approach Flow, veh/h	841		2103		410		
Demand Flow Rate, veh/h	858		2140		418		
Vehicles Circulating, veh/h	660		214		1807		
Vehicles Exiting, veh/h	1565		1304		214		
Follow-Up Headway, s	3.186		3.186		3.186		
Ped Vol Crossing Leg, #/h	0		0		0		
Ped Cap Adj	1.000		1.000		1.000		
Approach Delay, s/veh	16.3		34.0		40.0		
Approach LOS	C		D		E		
Lane	Left	Right	Left	Right	Bypass	Left	Right
Designated Moves	LTR	R	L	LTR	R	L	LTR
Assumed Moves	LTR	R	L	LTR	R	L	LTR
RT Channelized	Yield						
Lane Util	0.470	0.530	0.530	0.470		0.531	0.469
Critical Headway, s	4.293	4.113	4.293	4.113		4.293	4.113
Entry Flow, veh/h	403	455	958	849	333	222	196
Cap Entry Lane, veh/h	689	712	962	973	973	291	319
Entry HV Adj Factor	0.981	0.980	0.983	0.984	0.980	0.979	0.983
Flow Entry, veh/h	395	446	942	835	326	217	193
Cap Entry, veh/h	676	697	946	957	954	285	314
V/C Ratio	0.585	0.639	0.995	0.873	0.342	0.762	0.615
Control Delay, s/veh	15.5	17.0	49.1	27.4	7.4	47.7	31.2
LOS	C	C	E	D	A	E	D
95th %tile Queue, veh	4	5	19	12	2	6	4



Lane Group	WBL	WBR	NBT	NBR	SBL	SBT
Lane Configurations	↑	↑	↑↑		↑	↑↑
Traffic Volume (vph)	95	180	1530	120	220	1450
Future Volume (vph)	95	180	1530	120	220	1450
Satd. Flow (prot)	1711	1531	3384	0	1711	3421
Flt Permitted	0.950				0.058	
Satd. Flow (perm)	1711	1531	3384	0	104	3421
Satd. Flow (RTOR)		189	10			
Lane Group Flow (vph)	100	189	1735	0	231	1525
Turn Type	Prot	Perm	NA		pm+pt	NA
Protected Phases	8		2		1	6
Permitted Phases			8		6	
Total Split (s)	31.0	31.0	67.0		22.0	89.0
Total Lost Time (s)	5.0	5.0	5.0		5.0	4.0
Act Effct Green (s)	16.4	16.4	71.6		93.6	94.6
Actuated g/C Ratio	0.14	0.14	0.60		0.78	0.79
v/c Ratio	0.43	0.51	0.86		0.75	0.57
Control Delay	50.7	10.6	24.4		28.5	1.0
Queue Delay	0.0	0.0	0.0		0.0	0.0
Total Delay	50.7	10.6	24.4		28.5	1.0
LOS	D	B	C		C	A
Approach Delay	24.5		24.4		4.7	
Approach LOS	C		C		A	
Queue Length 50th (ft)	75	0	224		109	1
Queue Length 95th (ft)	116	61	#310		m#175	34
Internal Link Dist (ft)	376		617			1043
Turn Bay Length (ft)	200				400	
Base Capacity (vph)	370	479	2022		308	2696
Starvation Cap Reductn	0	0	1		0	0
Spillback Cap Reductn	0	0	0		0	0
Storage Cap Reductn	0	0	0		0	0
Reduced v/c Ratio	0.27	0.39	0.86		0.75	0.57

#### Intersection Summary

Cycle Length: 120

Actuated Cycle Length: 120

Offset: 0 (0%), Referenced to phase 2:NBT and 6:SBTL, Start of Green, Master Intersection

Control Type: Actuated-Coordinated

Maximum v/c Ratio: 0.86

Intersection Signal Delay: 15.2

Intersection LOS: B

Intersection Capacity Utilization 77.3%

ICU Level of Service D

Analysis Period (min) 15

# 95th percentile volume exceeds capacity, queue may be longer.

Queue shown is maximum after two cycles.

m Volume for 95th percentile queue is metered by upstream signal.

Splits and Phases: 2: Lynnway & Hanson St



Lynnway-Route 1A-Carroll Parkway Study  
3: Lynnway & Harding St

Alternative 5: 2040 SAT

12:00 pm

	↑	↑	↗	↖	↓	↙	↗	↖	↗	↖	↙	↖
Lane Group	NBL	NBT	NBR	SBL	SBT	SBR	NEL	NET	NER	SWL	SWT	SWR
Lane Configurations	↑	↑			↑	↑	↑	↑		↑	↑	
Traffic Volume (vph)	35	5	40	15	5	5	85	1555	75	200	1630	15
Future Volume (vph)	35	5	40	15	5	5	85	1555	75	200	1630	15
Satd. Flow (prot)	1711	1559	0	0	1734	1531	1711	3397	0	1711	3418	0
Flt Permitted	0.744				0.799		0.095			0.062		
Satd. Flow (perm)	1340	1559	0	0	1439	1531	171	3397	0	112	3418	0
Satd. Flow (RTOR)		42				109		6			1	
Lane Group Flow (vph)	37	47	0	0	21	5	89	1714	0	210	1730	0
Turn Type	Perm	NA		Perm	NA	Perm	pm+pt	NA		pm+pt	NA	
Protected Phases		8				4		5	2		1	6
Permitted Phases	8				4		4	2			6	
Total Split (s)	32.0	32.0		32.0	32.0	32.0	14.0	68.0		20.0	74.0	
Total Lost Time (s)	6.0	6.0			6.0	6.0	5.0	5.0		5.0	5.0	
Act Effct Green (s)	18.1	18.1			18.1	18.1	75.1	75.1		79.2	79.2	
Actuated g/C Ratio	0.15	0.15			0.15	0.15	0.63	0.63		0.66	0.66	
v/c Ratio	0.18	0.17			0.10	0.02	0.40	0.81		0.85	0.77	
Control Delay	42.2	14.7			39.8	0.0	15.6	9.8		64.0	10.5	
Queue Delay	0.0	0.0			0.0	0.0	0.0	0.0		0.0	0.0	
Total Delay	42.2	14.7			39.8	0.0	15.6	9.8		64.0	10.5	
LOS	D	B			D	A	B	A		E	B	
Approach Delay		26.8			32.1				10.1		16.3	
Approach LOS		C			C			B			B	
Queue Length 50th (ft)	23	3			13	0	9	643		132	216	
Queue Length 95th (ft)	54	36			36	0	m13	#814		m161	m226	
Internal Link Dist (ft)		148			94			1043			1857	
Turn Bay Length (ft)							300			300		
Base Capacity (vph)	290	370		311	417	222	2127			273	2254	
Starvation Cap Reductn	0	0			0	0	0	0		0	0	
Spillback Cap Reductn	0	0			0	0	0	0		0	0	
Storage Cap Reductn	0	0			0	0	0	0		0	0	
Reduced v/c Ratio	0.13	0.13			0.07	0.01	0.40	0.81		0.77	0.77	

Intersection Summary

Cycle Length: 120

Actuated Cycle Length: 120

Offset: 16 (13%), Referenced to phase 2:NETL and 6:SWTL, Start of Green

Control Type: Actuated-Coordinated

Maximum v/c Ratio: 0.85

Intersection Signal Delay: 13.7

Intersection LOS: B

Intersection Capacity Utilization 79.6%

ICU Level of Service D

Analysis Period (min) 15

# 95th percentile volume exceeds capacity, queue may be longer.

Queue shown is maximum after two cycles.

m Volume for 95th percentile queue is metered by upstream signal.

Splits and Phases: 3: Lynnway & Harding St



Lynnway-Route 1A-Carroll Parkway Study  
4: Commercial St & Lynnway

Alternative 5: 2040 SAT

12:00 pm



Lane Group	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations	↑	↑↑			↑↑	↑				↑	↑	↑
Traffic Volume (vph)	550	1380	10	0	1190	260	0	0	0	330	80	460
Future Volume (vph)	550	1380	10	0	1190	260	0	0	0	330	80	460
Satd. Flow (prot)	1711	3418	0	0	3421	1531	0	0	0	1711	1801	1531
Flt Permitted	0.083									0.950		
Satd. Flow (perm)	149	3418	0	0	3421	1531	0	0	0	1711	1801	1531
Satd. Flow (RTOR)		2				252						9
Lane Group Flow (vph)	578	1462	0	0	1251	273	0	0	0	347	84	484
Turn Type	pm+pt	NA			NA	Perm				Perm	NA	pt+ov
Protected Phases	5	2			6						4	45
Permitted Phases	2					6					4	
Total Split (s)	43.0	90.0			47.0	47.0				30.0	30.0	
Total Lost Time (s)	4.0	4.0			4.0	4.0				4.0	4.0	
Act Effct Green (s)	86.2	86.2			44.2	44.2				25.8	25.8	67.8
Actuated g/C Ratio	0.72	0.72			0.37	0.37				0.22	0.22	0.56
v/c Ratio	0.96	0.60			0.99	0.38				0.94	0.22	0.56
Control Delay	47.5	6.5			42.0	2.8				81.5	40.5	19.0
Queue Delay	0.0	0.0			0.0	0.0				0.0	0.0	0.0
Total Delay	47.5	6.5			42.0	2.8				81.5	40.5	19.0
LOS	D	A			D	A				F	D	B
Approach Delay	18.1				34.9					44.7		
Approach LOS	B				C					D		
Queue Length 50th (ft)	281	102			-434	7				266	54	217
Queue Length 95th (ft)	#600	137			#664	25				#449	100	316
Internal Link Dist (ft)	1857				1085			493		489		
Turn Bay Length (ft)	600					300				200		200
Base Capacity (vph)	614	2454			1259	723				370	390	874
Starvation Cap Reductn	0	0			0	0				0	0	0
Spillback Cap Reductn	0	0			0	0				0	0	0
Storage Cap Reductn	0	0			0	0				0	0	0
Reduced v/c Ratio	0.94	0.60			0.99	0.38				0.94	0.22	0.55

Intersection Summary

Cycle Length: 120

Actuated Cycle Length: 120

Offset: 102 (85%), Referenced to phase 2:EBTL and 6:WBT, Start of Green

Control Type: Actuated-Coordinated

Maximum v/c Ratio: 0.99

Intersection Signal Delay: 29.3

Intersection LOS: C

Intersection Capacity Utilization 93.3%

ICU Level of Service F

Analysis Period (min) 15

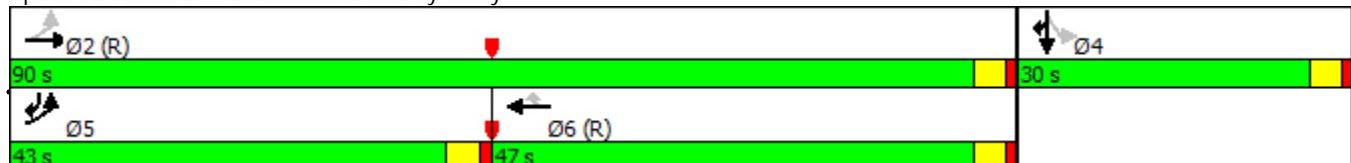
~ Volume exceeds capacity, queue is theoretically infinite.

Queue shown is maximum after two cycles.

# 95th percentile volume exceeds capacity, queue may be longer.

Queue shown is maximum after two cycles.

Splits and Phases: 4: Commercial St & Lynnway



Lynnway-Route 1A-Carroll Parkway Study  
5: Marine Blvd/Sheppard St & Lynnway

Alternative 5: 2040 SAT

12:00 pm



Lane Group	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations	↑	↑↑		↑	↑↑		↑	↑			↔	
Traffic Volume (vph)	115	1560	5	55	1400	50	5	5	5	35	5	30
Future Volume (vph)	115	1560	5	55	1400	50	5	5	5	35	5	30
Satd. Flow (prot)	1711	3421	0	1711	3404	0	1711	1666	0	0	1656	0
Flt Permitted	0.098			0.095			0.735				0.840	
Satd. Flow (perm)	176	3421	0	171	3404	0	1323	1666	0	0	1425	0
Satd. Flow (RTOR)						4			5			29
Lane Group Flow (vph)	121	1645	0	58	1525	0	5	10	0	0	74	0
Turn Type	pm+pt	NA		pm+pt	NA		Perm	NA		Perm	NA	
Protected Phases	5	2		1	6				8			4
Permitted Phases	2			6			8				4	
Total Split (s)	20.0	75.0		13.0	68.0		32.0	32.0		32.0	32.0	
Total Lost Time (s)	6.0	6.0		6.0	6.0		6.0	6.0			6.0	
Act Effct Green (s)	89.9	83.0		83.7	76.7		18.4	18.4			18.4	
Actuated g/C Ratio	0.75	0.69		0.70	0.64		0.15	0.15			0.15	
v/c Ratio	0.48	0.70		0.28	0.70		0.02	0.04			0.30	
Control Delay	19.5	7.9		8.6	8.3		37.4	27.9			29.4	
Queue Delay	0.0	0.0		0.0	0.1		0.0	0.0			0.0	
Total Delay	19.5	7.9		8.6	8.3		37.4	27.9			29.4	
LOS	B	A		A	A		D	C			C	
Approach Delay		8.7			8.3			31.1			29.4	
Approach LOS		A			A			C			C	
Queue Length 50th (ft)	22	203		4	60		3	3			28	
Queue Length 95th (ft)	m65	m283		m18	208		14	18			72	
Internal Link Dist (ft)		1085			554			123			164	
Turn Bay Length (ft)	250			200								
Base Capacity (vph)	314	2365		209	2178		286	364			331	
Starvation Cap Reductn	0	0		0	53		0	0			0	
Spillback Cap Reductn	0	0		0	0		0	0			0	
Storage Cap Reductn	0	0		0	0		0	0			0	
Reduced v/c Ratio	0.39	0.70		0.28	0.72		0.02	0.03			0.22	

#### Intersection Summary

Cycle Length: 120

Actuated Cycle Length: 120

Offset: 68 (57%), Referenced to phase 2:EBTL and 6:WBTL, Start of Green

Control Type: Actuated-Coordinated

Maximum v/c Ratio: 0.70

Intersection Signal Delay: 9.1

Intersection LOS: A

Intersection Capacity Utilization 75.8%

ICU Level of Service D

Analysis Period (min) 15

m Volume for 95th percentile queue is metered by upstream signal.

Splits and Phases: 5: Marine Blvd/Sheppard St & Lynnway



Lynnway-Route 1A-Carroll Parkway Study  
15: Blossom St & Lynnway

Alternative 5: 2040 SAT

12:00 pm



Lane Group	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Traffic Volume (vph)	0	1610	45	30	1430	120	5	10	10	10	10	30
Future Volume (vph)	0	1610	45	30	1430	120	5	10	10	10	10	30
Satd. Flow (prot)	0	3408	0	1711	3380	0	1711	1666	0	1711	1599	0
Flt Permitted				0.083				0.729			0.743	
Satd. Flow (perm)	0	3408	0	149	3380	0	1313	1666	0	1338	1599	0
Satd. Flow (RTOR)			4			17			11			32
Lane Group Flow (vph)	0	1740	0	32	1630	0	5	22	0	11	43	0
Turn Type	NA		pm+pt	NA			Perm	NA		Perm	NA	
Protected Phases	2		1	6				8			4	
Permitted Phases			6				8				4	
Total Split (s)	80.0		9.0	79.0			31.0	31.0			31.0	31.0
Total Lost Time (s)	5.0		5.0	5.0			5.0	5.0			5.0	5.0
Act Effct Green (s)	89.9		94.3	95.3			17.8	17.8			17.8	17.8
Actuated g/C Ratio	0.75		0.79	0.79			0.15	0.15			0.15	0.15
v/c Ratio	0.68		0.18	0.61			0.03	0.09			0.06	0.16
Control Delay	3.5		2.4	1.2			37.4	25.2			38.4	18.4
Queue Delay	0.0		0.0	0.0			0.0	0.0			0.0	0.0
Total Delay	3.5		2.4	1.3			37.4	25.2			38.4	18.4
LOS	A		A	A			D	C			D	B
Approach Delay	3.5			1.3				27.5				22.4
Approach LOS	A			A				C				C
Queue Length 50th (ft)	60		1	37			3	7			7	7
Queue Length 95th (ft)	72		m1	18			14	30			23	38
Internal Link Dist (ft)	554			496				259				262
Turn Bay Length (ft)			200									
Base Capacity (vph)	2554		177	2688			284	369			289	371
Starvation Cap Reductn	0		0	47			0	0			0	0
Spillback Cap Reductn	0		0	31			0	0			0	0
Storage Cap Reductn	0		0	0			0	0			0	0
Reduced v/c Ratio	0.68		0.18	0.62			0.02	0.06			0.04	0.12

#### Intersection Summary

Cycle Length: 120

Actuated Cycle Length: 120

Offset: 63 (53%), Referenced to phase 2:EBT and 6:WBTL, Start of Green

Control Type: Actuated-Coordinated

Maximum v/c Ratio: 0.68

Intersection Signal Delay: 2.9

Intersection LOS: A

Intersection Capacity Utilization 62.4%

ICU Level of Service B

Analysis Period (min) 15

m Volume for 95th percentile queue is metered by upstream signal.

Splits and Phases: 15: Blossom St & Lynnway



Lane Group	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations	↑	↑↑		↑	↑↑		↑	↑				
Traffic Volume (vph)	65	1530	15	15	1500	40	30	20	30	0	0	0
Future Volume (vph)	65	1530	15	15	1500	40	30	20	30	0	0	0
Satd. Flow (prot)	1711	3418	0	1711	3408	0	1711	1637	0	0	0	0
Flt Permitted	0.122				0.114			0.950				
Satd. Flow (perm)	220	3418	0	205	3408	0	1711	1637	0	0	0	0
Satd. Flow (RTOR)		2				4			32			
Lane Group Flow (vph)	68	1625	0	16	1619	0	32	53	0	0	0	0
Turn Type	pm+pt	NA		pm+pt	NA		Split	NA				
Protected Phases	5	2		1	6		8	8				
Permitted Phases	2			6								
Total Split (s)	14.0	80.0		10.0	76.0		30.0	30.0				
Total Lost Time (s)	4.0	4.0		4.0	4.0		4.0	4.0				
Act Effct Green (s)	99.8	99.8		91.8	92.6		10.9	10.9				
Actuated g/C Ratio	0.83	0.83		0.76	0.77		0.09	0.09				
v/c Ratio	0.23	0.57		0.07	0.62		0.21	0.30				
Control Delay	4.6	3.0		0.9	6.8		50.0	27.4				
Queue Delay	0.0	0.0		0.0	0.0		0.0	0.0				
Total Delay	4.6	3.1		0.9	6.8		50.0	27.4				
LOS	A	A		A	A		D	C				
Approach Delay		3.1			6.7			35.9				
Approach LOS		A			A			D				
Queue Length 50th (ft)	6	77		0	151		24	16				
Queue Length 95th (ft)	m11	103		m1	m687		48	48				
Internal Link Dist (ft)		496			544			258				42
Turn Bay Length (ft)	200		300									
Base Capacity (vph)	305	2844		232	2632		370	379				
Starvation Cap Reductn	0	115		0	0		0	0				
Spillback Cap Reductn	0	0		0	0		0	0				
Storage Cap Reductn	0	0		0	0		0	0				
Reduced v/c Ratio	0.22	0.60		0.07	0.62		0.09	0.14				

#### Intersection Summary

Cycle Length: 120

Actuated Cycle Length: 120

Offset: 64 (53%), Referenced to phase 2:EBTL and 6:WBTL, Start of Green

Control Type: Actuated-Coordinated

Maximum v/c Ratio: 0.62

Intersection Signal Delay: 5.7

Intersection LOS: A

Intersection Capacity Utilization 62.0%

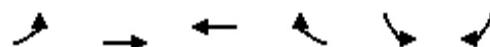
ICU Level of Service B

Analysis Period (min) 15

m Volume for 95th percentile queue is metered by upstream signal.

Splits and Phases: 6: Kingman St & Lynnway





Lane Group	EBL	EBT	WBT	WBR	SBL	SBR	Ø5
Lane Configurations		↑↑			↑↑		
Traffic Volume (vph)	0	985	0	0	330	0	
Future Volume (vph)	0	985	0	0	330	0	
Satd. Flow (prot)	0	3421	0	0	3319	0	
Flt Permitted					0.950		
Satd. Flow (perm)	0	3421	0	0	3319	0	
Satd. Flow (RTOR)					338		
Lane Group Flow (vph)	0	1036	0	0	347	0	
Turn Type		NA			Prot		
Protected Phases		2			7		5
Permitted Phases							
Total Split (s)		93.0			27.0		48.0
Total Lost Time (s)		4.0			4.0		
Act Effct Green (s)		104.0			8.0		
Actuated g/C Ratio		0.87			0.07		
v/c Ratio		0.35			0.65		
Control Delay		1.6			9.8		
Queue Delay		0.0			0.0		
Total Delay		1.6			9.8		
LOS		A			A		
Approach Delay		1.6			9.8		
Approach LOS		A			A		
Queue Length 50th (ft)		1			8		
Queue Length 95th (ft)		117			m12		
Internal Link Dist (ft)	384	1232			276		
Turn Bay Length (ft)							
Base Capacity (vph)		2965			909		
Starvation Cap Reductn		0			0		
Spillback Cap Reductn		0			0		
Storage Cap Reductn		0			0		
Reduced v/c Ratio		0.35			0.38		

#### Intersection Summary

Cycle Length: 120

Actuated Cycle Length: 120

Offset: 113 (94%), Referenced to phase 2:EBT, Start of Green

Control Type: Actuated-Coordinated

Maximum v/c Ratio: 0.65

Intersection Signal Delay: 3.7

Intersection LOS: A

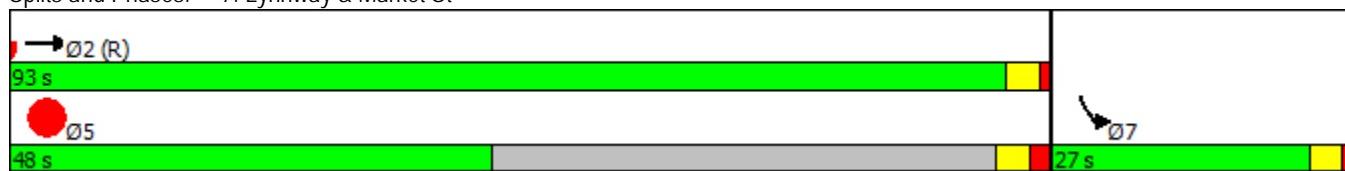
Intersection Capacity Utilization 44.0%

ICU Level of Service A

Analysis Period (min) 15

m Volume for 95th percentile queue is metered by upstream signal.

Splits and Phases: 7: Lynnway & Market St



Lynnway-Route 1A-Carroll Parkway Study  
9: Market St & Broad St

Alternative 5: 2040 SAT  
12:00 pm

	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations	↑	↑↑		↑	↑↑↑					↔↔		
Traffic Volume (vph)	300	300	0	75	1280	275	0	0	0	205	230	155
Future Volume (vph)	300	300	0	75	1280	275	0	0	0	205	230	155
Satd. Flow (prot)	1711	3421	0	1711	4783	0	0	0	0	0	3232	0
Flt Permitted	0.950				0.950						0.983	
Satd. Flow (perm)	1711	3421	0	1711	4783	0	0	0	0	0	3232	0
Satd. Flow (RTOR)						40					37	
Lane Group Flow (vph)	315	315	0	79	1635	0	0	0	0	0	621	0
Turn Type	Prot	NA		Prot	NA					Perm	NA	
Protected Phases	5	2		1	6						8	
Permitted Phases											8	
Total Split (s)	25.0	49.0		17.0	41.0					27.0	27.0	
Total Lost Time (s)	4.0	5.0		5.0	5.0						5.0	
Act Effct Green (s)	25.1	59.0		10.1	42.7						22.0	
Actuated g/C Ratio	0.21	0.49		0.08	0.36						0.18	
v/c Ratio	0.88	0.19		0.55	0.95						1.00	
Control Delay	65.7	16.7		72.5	40.2						82.0	
Queue Delay	0.0	0.0		0.0	0.0						0.0	
Total Delay	65.7	16.7		72.5	40.2						82.0	
LOS	E	B		E	D						F	
Approach Delay		41.2			41.7						82.0	
Approach LOS		D			D						F	
Queue Length 50th (ft)	~260	85		63	~532						242	
Queue Length 95th (ft)	#446	146		m88	#619						#370	
Internal Link Dist (ft)		510			739			276			264	
Turn Bay Length (ft)	200		200									
Base Capacity (vph)	358	1681		171	1727						622	
Starvation Cap Reductn	0	0		0	0						0	
Spillback Cap Reductn	0	0		0	0						0	
Storage Cap Reductn	0	0		0	0						0	
Reduced v/c Ratio	0.88	0.19		0.46	0.95						1.00	

#### Intersection Summary

Cycle Length: 120

Actuated Cycle Length: 120

Offset: 31 (26%), Referenced to phase 2:EBT and 6:WBT, Start of Green

Control Type: Actuated-Coordinated

Maximum v/c Ratio: 1.00

Intersection Signal Delay: 50.0

Intersection LOS: D

Intersection Capacity Utilization 77.7%

ICU Level of Service D

Analysis Period (min) 15

~ Volume exceeds capacity, queue is theoretically infinite.

Queue shown is maximum after two cycles.

# 95th percentile volume exceeds capacity, queue may be longer.

Queue shown is maximum after two cycles.

m Volume for 95th percentile queue is metered by upstream signal.

Splits and Phases: 9: Market St & Broad St





Lane Group	EBL	EBT	WBT	WBR2	NBL2	NBT	NBR	SBL	SBT	SBR	Ø9
Lane Configurations		↑↑	↑↑		↑↑	↑			↑		
Traffic Volume (vph)	20	530	605	15	970	220	15	10	0	45	
Future Volume (vph)	20	530	605	15	970	220	15	10	0	45	
Satd. Flow (prot)	0	3414	3408	0	3319	1783	0	0	1590	0	
Flt Permitted		0.911				0.750				0.943	
Satd. Flow (perm)	0	3117	3408	0	2620	1783	0	0	1513	0	
Satd. Flow (RTOR)			73			4					
Lane Group Flow (vph)	0	578	652	0	1020	247	0	0	58	0	
Turn Type	Perm	NA	NA		Perm	NA		Perm	NA		
Protected Phases		2	6				8		4		9
Permitted Phases	2				8				4		
Total Split (s)	38.0	38.0	38.0		59.0	59.0		59.0	59.0		23.0
Total Lost Time (s)		7.0	7.0		6.0	6.0			4.0		
Act Effct Green (s)	51.1	51.1			51.3	51.3			53.3		
Actuated g/C Ratio	0.43	0.43			0.43	0.43			0.44		
v/c Ratio	0.44	0.44			0.91	0.32			0.09		
Control Delay	20.5	24.5			45.0	23.4			19.0		
Queue Delay	0.0	0.0			0.0	0.0			0.0		
Total Delay	20.5	24.5			45.0	23.4			19.0		
LOS	C	C			D	C			B		
Approach Delay	20.5	24.5				40.8			19.0		
Approach LOS	C	C			D				B		
Queue Length 50th (ft)	143	155			364	119			25		
Queue Length 95th (ft)	m211	283			#481	182			50		
Internal Link Dist (ft)	739	345				1199			214		
Turn Bay Length (ft)											
Base Capacity (vph)	1327	1492			1157	789			693		
Starvation Cap Reductn	0	0			0	0			0		
Spillback Cap Reductn	0	0			0	0			0		
Storage Cap Reductn	0	0			0	0			0		
Reduced v/c Ratio	0.44	0.44			0.88	0.31			0.08		

#### Intersection Summary

Cycle Length: 120

Actuated Cycle Length: 120

Offset: 81 (68%), Referenced to phase 2:EBTL, Start of Green

Control Type: Actuated-Coordinated

Maximum v/c Ratio: 0.91

Intersection Signal Delay: 31.5

Intersection LOS: C

Intersection Capacity Utilization 75.5%

ICU Level of Service D

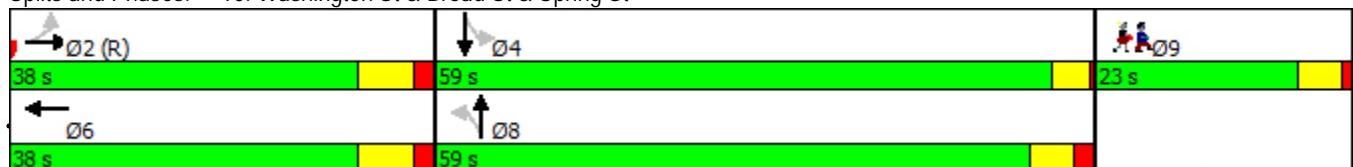
Analysis Period (min) 15

# 95th percentile volume exceeds capacity, queue may be longer.

Queue shown is maximum after two cycles.

m Volume for 95th percentile queue is metered by upstream signal.

Splits and Phases: 10: Washington St & Broad St & Spring St



**Intersection**

Intersection Delay, s/veh 16.6

Intersection LOS C

Approach	WB	SB	NE
Entry Lanes	2	2	2
Conflicting Circle Lanes	2	2	2
Adj Approach Flow, veh/h	1047	1424	867
Demand Flow Rate, veh/h	1068	1452	884
Vehicles Circulating, veh/h	482	306	777
Vehicles Exiting, veh/h	1179	1244	306
Follow-Up Headway, s	3.186	3.186	3.186
Ped Vol Crossing Leg, #/h	0	0	0
Ped Cap Adj	1.000	1.000	1.000
Approach Delay, s/veh	16.9	13.4	21.4
Approach LOS	C	B	C

Lane	Left	Right	Left	Right	Bypass	Left	Right
Designated Moves	LTR	R	L	LTR	R	L	LTR
Assumed Moves	LTR	R	L	LTR	R	L	LTR
RT Channelized					Yield		
Lane Util	0.470	0.530	0.530	0.470		0.531	0.469
Critical Headway, s	4.293	4.113	4.293	4.113		4.293	4.113
Entry Flow, veh/h	502	566	412	365	675	469	415
Cap Entry Lane, veh/h	787	806	898	912	912	631	656
Entry HV Adj Factor	0.980	0.980	0.980	0.981	0.980	0.980	0.982
Flow Entry, veh/h	492	555	404	358	662	460	407
Cap Entry, veh/h	772	791	880	895	894	618	644
V/C Ratio	0.638	0.702	0.459	0.400	0.740	0.743	0.633
Control Delay, s/veh	15.7	18.0	9.8	8.7	18.3	24.5	17.9
LOS	C	C	A	A	C	C	C
95th %tile Queue, veh	5	6	2	2	7	7	4

**TABLE 1**  
**Alternative 5: Traffic Queue Lengths in Feet**

Intersection/Approach	Movement	Weekday AM 50 <sup>th</sup> Percentile	Weekday AM 95 <sup>th</sup> Percentile	Weekday PM 50 <sup>th</sup> Percentile	Weekday PM 95 <sup>th</sup> Percentile	Saturday PM 50 <sup>th</sup> Percentile	Saturday PM 95 <sup>th</sup> Percentile
Lynnway and Hanson Street	--	--	--	--	--	--	--
Lynnway	NB – Through/right	221	272	774	#1256	224	#310
Lynnway	SB – Left	0	0	~157	#337	110	m#175
Lynnway	SB – Through/right	91	164	74	173	0	34
Hanson Street	WB – Left	13	35	59	95	75	116
Hanson Street	WB – Right	0	19	0	46	0	61
Lynnway and Harding Street	--	--	--	--	--	--	--
Lynnway	NB – Left	6	m28	0	7	9	m13
Lynnway	NB – Through/right	155	183	m#1213	~1250	643	#814
Lynnway	SB – Left	15	m20	103	m#139	132	m161
Lynnway	SB – Through/right	~m#1047	~1201	50	m55	216	m226
Harding Street	WB – Left	16	42	27	59	23	54
Harding Street	WB – Through/right	0	0	0	0	3	36
Harding Street	EB – Left/Through	3	14	20	49	13	36
Harding Street	EB – Right	0	0	0	0	0	0
Lynnway and Commercial Street	--	--	--	--	--	--	--
Lynnway	NB – Left	102	#321	m#386	~469	281	#600
Lynnway	NB – Through/right	20	50	27	m28	102	137
Lynnway	SB – Through	~1070	m#1129	241	3563	~426	#655
Lynnway	SB – Right	24	25	0	81	2	25
Commercial Street	EB – Left	185	279	277	#467	266	#449
Commercial Street	EB – Through	65	115	16	41	54	100
Commercial Street	EB -- Right	412	#643	113	172	217	216
Lynnway, Shepard Street, and Marine Boulevard	--	--	--	--	--	--	--
Lynnway	NB – Left	6	m36	1	m22	22	m65
Lynnway	NB – Through/right	90	95	157	m#1248	203	m283
Lynnway	SB – Left	0	0	1	8	4	m17
Lynnway	SB – Through/right	~1153	#1294	33	80	61	206
Marine Boulevard	WB – Left	7	23	15	36	3	14
Marine Boulevard	WB – Through/right	0	0	4	23	3	18
Shepard Street	EB – Left/through/right	32	72	39	76	28	72
Lynnway and Kingman Street	--	--	--	--	--	--	--
Lynnway	NB – Left	7	34	6	m9	5	m10
Lynnway	NB – Through/right	236	297	231	#1092	69	91
Lynnway	SB – Left	0	0	22	m43	0	0
Lynnway	SB – Through/right	149	m754	40	m530	151	m687
Kingman Street	WB – Left	30	63	79	121	24	48
Kingman Street	WB – Through/right	3	39	20	69	16	48

Lynnway, Carroll Parkway, and Market Street	--	--	--	--	--	--	--	--
Lynnway	NB – Through	2	5	320	708	2	112	
Market Street	EB – Left	41	m52	1	m4	8	m12	
Carroll Parkway, Nahant Road, and Lynn Shore Drive	--	--	--	--	--	--	--	--
Carroll Parkway	NB – Left	25	50	230	475	25	50	
Carroll Parkway	NB – Right	25	50	125	300	125	175	
Nahant Road	NB – Left	37	75	75	150	87	175	
Nahant Road	NB – Through	25	50	37	100	50	100	
Lynn Shore Drive	SB – Through	235	475	50	100	65	125	
Lynn Shore Drive	SB – Right	330	650	36	125	75	150	
Market Street and Broad Street	--	--	--	--	--	--	--	--
Market Street	SB – Left/through/right	166	#276	~345	#475	242	#370	
Broad Street	WB -- Left	43	m60	39	m70	63	m88	
Broad Street	WB – Through/right	~801	#920	341	#465	~532	#619	
Broad Street	EB – Left	~87	#206	184	#247	~259	#446	
Broad Street	EB – Through/right	95	142	217	m252	88	146	
Broad Street, Washington Street, and Spring Street	--	--	--	--	--	--	--	--
Broad Street	WB – Through/right	174	#316	238	m296	155	283	
Broad Street	EB – Through	108	m152	72	158	143	m120	
Washington Street	NB – Left	515	631	331	389	364	#481	
Washington Street	NB – Through/right	528	807	137	198	119	182	

# **APPENDIX M**

## **MassDOT Highway Division Project Development Process**

## **Overview of the Project Development Process**

Transportation decision-making is complex and can be influenced by legislative mandates, environmental regulations, financial limitations, agency programmatic commitments, and partnering opportunities. Decision-makers and reviewing agencies, when consulted early and often throughout the project development process, can ensure that all participants understand the potential impact these factors can have on project implementation. Project development is the process that takes a transportation improvement from concept through construction.

The MassDOT Highway Division has developed a comprehensive project development process which is contained in Chapter 2 of the *MassDOT Highway Division's Project Development and Design Guide*. The eight-step process covers a range of activities extending from identification of a project need, through completion of a set of finished contract plans, to construction of the project. The sequence of decisions made through the project development process progressively narrows the project focus and, ultimately, leads to a project that addresses the identified needs. The descriptions provided below are focused on the process for a highway project, but the same basic process will need to be followed for non-highway projects as well.

### **1. Needs Identification**

For each of the locations at which an improvement is to be implemented, MassDOT leads an effort to define the problem, establishes project goals and objectives, and defines the scope of the planning needed for implementation. To that end, it has to complete a Project Need Form (PNF), which states in general terms the deficiencies or needs related to the transportation facility or location. The PNF documents the problems and explains why corrective action is needed. For this study, the information defining the need for the project will be drawn primarily, perhaps exclusively, from the present report. Also, at this point in the process, MassDOT meets with potential participants, such as the Metropolitan Planning Organization (MPO) and community members, to allow for an informal review of the project.

The PNF is reviewed by the MassDOT Highway Division district office whose jurisdiction includes the location of the proposed project. MassDOT also sends the PNF to the MPO, for informational purposes. The outcome of this step determines whether the project requires further planning, whether it is already well supported by prior planning studies, and, therefore, whether it is ready to move forward into the design phase, or whether it should be dismissed from further consideration.

### **2. Planning**

This phase will likely not be required for the implementation of the improvements proposed in this planning study, as this planning report should constitute the outcome of this step. However, in general, the purpose of this implementation step is for the project proponent to identify issues, impacts, and approvals that may need to be obtained, so that the subsequent design and permitting processes are understood.

The level of planning needed will vary widely, based on the complexity of the project. Typical tasks include: define the existing context, confirm project need, establish goals and objectives, initiate public outreach, define the project, collect data, develop and analyze alternatives, make recommendations, and provide documentation. Likely outcomes include consensus on the project definition to enable it to move forward into environmental documentation (if needed) and design, or a recommendation to delay the project or dismiss it from further consideration.

### **3. Project Initiation**

At this point in the process, the proponent, MassDOT Highway Division, fills out a Project Initiation Form (PIF) for each improvement, which is reviewed by its Project Review Committee (PRC) and the MPO. The PRC is composed of the Chief Engineer, each District Highway Director, and representatives of the Project Management, Environmental, Planning, Right-of-Way, Traffic, and Bridge departments, and the MassDOT Federal Aid Program Office (FAPO). The PIF documents the project type and description, summarizes the project planning process, identifies likely funding and project management responsibility, and defines a plan for interagency and public participation. First the PRC reviews and evaluates the proposed project based on the MassDOT's statewide priorities and criteria. If the result is positive, MassDOT Highway Division moves the project forward to the design phase, and to programming review by the MPO. The PRC may provide a Project Management Plan to define roles and responsibilities for subsequent steps. The MPO review includes project evaluation based on the MPO's regional priorities and criteria. The MPO may assign project evaluation criteria score, a Transportation Improvement Program (TIP) year, a tentative project category, and a tentative funding category.

### **4. Environmental Permitting, Design, and Right-of-Way Process**

This step has four distinct but closely integrated elements: public outreach, environmental documentation and permitting (if required), design, and right-of-way acquisition (if required). The outcome of this step is a fully designed and permitted project ready for construction. However, a project does not have to be fully designed in order for the MPO to program it in the TIP. The sections below provide more detailed information on the four elements of this step of the project development process.

#### **Public Outreach**

Continued public outreach in the design and environmental process is essential to maintain public support for the project and to seek meaningful input on the design elements. The public outreach is often in the form of required public hearings, but can also include less formal dialogues with those interested in and affected by a proposed project.

#### **Environmental Documentation and Permitting**

The project proponent, in coordination with the Environmental Services section of the MassDOT Highway Division, will be responsible for identifying and complying with all applicable federal, state, and local environmental laws and requirements. This includes determining the appropriate project category for both the Massachusetts Environmental Protection Act (MEPA) and the National Environmental Protection Act (NEPA). Environmental documentation and permitting is often completed in conjunction with the **Preliminary Design** phase described below.

#### **Design**

There are three major phases of design. The first is **Preliminary Design**, which is also referred to as the 25-percent submission. The major components of this phase include full survey of the project area, preparation of base plans, development of basic geometric layout, development of preliminary cost estimates, and submission of a functional design report. Preliminary Design, although not required to, is often completed in conjunction with the Environmental Documentation and Permitting. The next phase is **Final Design**, which is also referred to as the 75-percent and 100-percent submission. The major components of this phase include preparation of a subsurface exploratory plan (if required), coordination of utility relocations, development of traffic management plans through construction zones, development of final cost estimates, and refinement and finalization of the construction plans. Once Final Design is complete, a full set of **Plans, Specifications, and Estimates (PS&E)** is developed for the project.

### **Right-of-Way Acquisition**

A separate set of Right-of-Way plans are required for any project that requires land acquisition or easements. The plans must identify the existing and proposed layout lines, easements, property lines, names of property owners, and the dimensions and areas of estimated takings and easements.

### **5. Programming (*Identification of Funding*)**

Programming, which typically begins during the design phase, can actually occur at any time during the process, from planning to design. In this step, which is distinct from project initiation, the proponent requests that the MPO place the project in the region's Transportation Improvement Program (TIP). The proponent requesting the project's listing on the TIP can be the community or it can be one of the MPO member agencies (the Regional Planning Agency, MassDOT, and the Regional Transit Authority). The MPO then considers the project in terms of state and regional needs, evaluation criteria, and compliance with the regional Transportation Plan and decides whether to place it in the draft TIP for public review and then in the final TIP.

### **6. Procurement**

Following project design and programming of a highway project, the MassDOT Highway Division publishes a request for proposals. It then reviews the bids and awards the contract to the qualified bidder with the lowest bid.

### **7. Construction**

After a construction contract is awarded, MassDOT Highway Division and the contractor develop a public participation plan and a management plan for the construction process.

### **8. Project Assessment**

The purpose of this step is to receive constituents' comments on the project development process and the project's design elements. MassDOT Highway Division can apply what is learned in this process to future projects.

## Project Development Schematic Timetable

Description	Schedule Influence	Typical Duration
<b>Step I: Problem/Need/Opportunity</b> <b>Identification</b> The proponent completes a Project Need Form (PNF). This form is then reviewed by the MassDOT District office which provides guidance to the proponent on the subsequent steps of the process.	The Project Need Form has been developed so that it can be prepared quickly by the proponent, including any supporting data that is readily available. The District office shall return comments to the proponent within one month of PNF submission.	1 to 3 months
<b>Step II: Planning</b> Project planning can range from agreement that the problem should be addressed through a clear solution to a detailed analysis of alternatives and their impacts.	For some projects, no planning beyond preparation of the Project Need Form is required. Some projects require a planning study centered on specific project issues associated with the proposed solution or a narrow family of alternatives. More complex projects will likely require a detailed alternatives analysis.	Project Planning Report: 3 to 24+ months
<b>Step III: Project Initiation</b> The proponent prepares and submits a Project Initiation Form (PIF) and a Transportation Evaluation Criteria (TEC) form in this step. The PIF and TEC are informally reviewed by the Metropolitan Planning Organization (MPO) and MassDOT District office, and formally reviewed by the PRC.	The PIF includes refinement of the preliminary information contained in the PNF. Additional information summarizing the results of the planning process, such as the Project Planning Report, are included with the PIF and TEC. The schedule is determined by PRC staff review (dependent on project complexity) and meeting schedule.	1 to 4 months
<b>Step IV: Design, Environmental, and Right of Way</b> The proponent completes the project design. Concurrently, the proponent completes necessary environmental permitting analyses and files applications for permits. Any right of way needed for the project is identified and the acquisition process begins.	The schedule for this step is dependent upon the size of the project and the complexity of the design, permitting, and right-of-way issues. Design review by the MassDOT district and appropriate sections is completed in this step.	3 to 48+ months
<b>Step V: Programming</b> The MPO considers the project in terms of its regional priorities and determines whether or not to include the project in the draft Regional Transportation Improvement Program (TIP) which is then made available for public comment. The TIP includes a project description and funding source.	The schedule for this step is subject to each MPO's programming cycle and meeting schedule. It is also possible that the MPO will not include a project in its Draft TIP based on its review and approval procedures.	3 to 12+ months
<b>Step VI: Procurement</b> The project is advertised for construction and a contract awarded.	Administration of competing projects can influence the advertising schedule.	1 to 12 months
<b>Step VII: Construction</b> The construction process is initiated including public notification and any anticipated public involvement. Construction continues to project completion.	The duration for this step is entirely dependent upon project complexity and phasing.	3 to 60+ months
<b>Step VIII: Project Assessment</b> The construction period is complete and project elements and processes are evaluated on a voluntary basis.	The duration for this step is dependent upon the proponent's approach to this step and any follow-up required.	1 month

Source: MassDOT Highway Division Project Development and Design Guide

